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A BIBLIOGRAPHY ON MICROWAVE (ROTATIONAL) SPECTROSCOPY

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James E. Wollrab

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REDSTONE ARSENAL, ALABAMA

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ABSTRACT

The references listed in this bibliography include a majority of the important papers and books that are related to the development of microwave spectroscopy. General references relating to the basic concepts of rotational and, in a limited way, vibrational spectroscopy are also included. Titles of dissertations, reports which have not been published in the open literature, and abstracts of papers presented at spectroscopy symposia generally are not given. Rather than a pure chronological listing, the references have been placed under specific topic headings whenever possible. A chronological order under these headings is maintained. Since a unique classification of each article is impossible, references which do not fall directly under one of the specific topics are listed in Section XII.

Several other bibliographies are available. Townes and Schawlow[20] compiled a complete listing up through 1954. In addition, Favero[35] has compiled a bibliography covering 1954 through 1962, and Starck[39] has completed one for 1945 through 1962. However, the latter two are not as generally available as might be desired. (See Section I.)

This bibliography includes a majority of the references concerning microwave spectroscopy through 1964, and a number of references from early 1965. Titles are listed to enable a better preliminary assessment of the articles. The listing is a print from IBM cards and a special notation is required in some instances. Atomic weights are given in parentheses following the atomic symbol, e.g., N(14) for N^{14}. All letters are in the upper case, e.g., L-TYPE DOUBLING is written for *l*-type doubling. Numerical subscripts are written on the same level as the atomic symbol, e.g., H2S is written for H_2S.

Preceding some of the reference lists are very brief resumes. These are not intented to serve as reviews of each area but merely to point out some of the more important or recent progress in each area.

CONTENTS

Section I. GENERAL AND REVIEW ARTICLES

1. E.U.CONDON AND G.H.SHORTLEY,THE THEORY OF ATOMIC SPECTRA, MCGRAW-HILL BOOK COMPANY INC,NEW YORK(1935)

2. G.HERZBERG,INFRARED AND RAMAN SPECTRA,D.VAN NOSTRAND COMPANY INC., NEW YORK(1945)

3. W.GORDY,REVS.MOD.PHYS.20,668-717(1948) MICROWAVE SPECTROSCOPY

4. B.P.DAILEY,ANAL.CHEM.21,540-544(1949) MICROWAVE SPECTRA AND CHEMICAL ANALYSIS

5. H.B.G.CASIMIR,NED.TIJDSCHR.NATUURKDE 16,198-206(1950) THE INFLUENCE OF MAGNETIC AND ELECTRICAL PROPERTIES OF ATOMIC NUCLEI ON THE ENERGY LEVELS OF ATOMS AND MOLECULES

6. B.L.CRAWFORD,JR. AND D.E.MANN,ANN.REV.PHYS.CHEM.1,151-169(1950) SPECTROSCOPY

7. G.HERZBERG,SPECTRA OF DIATOMIC MOLECULES,D.VAN NOSTRAND COMPANY, NEW YORK(1950)

8. P.KISLIUK AND C.H.TOWNES,J.RESEARCH NATL.BUR.STANDARDS 44,611-641 (1950) MOLECULAR MICROWAVE SPECTRA TABLES

9. D.H.WHIFFEN,QUART.REV.4,131-152(1950) ROTATION SPECTRA

10. E.B.WILSON,JR.,ANN.REV.PHYS.CHEM.2,151-176(1951) MICROWAVE SPECTROSCOPY OF GASES

11. B.BAK,TRANS.INSTRUM.MEAS.CONF.1952,8-14(1952) A MICROWAVE SPECTROSCOPE AND A REVIEW OF MICROWAVE SPECTROSCOPY

12. P.KISLIUK AND C.H.TOWNES,CIRC.NAT.BUR.STAND.,NO.518(1952) MOLECULAR MICROWAVE SPECTRA TABLES

13. A.H.NETHERCOT,J.A.KLEIN,J.H.N.LOUBSER,AND C.H.TOWNES,NUOVO CIMENTO 9, 358-363(1952) SPECTROSCOPY NEAR THE BOUNDARY BETWEEN THE MICROWAVE AND INFRARED REGIONS

14. C.H.TOWNES,ANN.N.Y.ACAD.SCI.55,745-750(1952) THE PRESENT STATUS OF MICROWAVE SPECTROSCOPY

15. E.B.WILSON,JR.,ANN.N.Y.ACAD.SCI.55,943-954(1952) THE SIGNIFICANCE OF THE RESULTS OF MICROWAVE SPECTROSCOPY TO CHEMICAL VALENCE THEORY

16. B.P.DAILEY,ANN.REV.PHYS.CHEM.4,425-444(1953) MICROWAVES AND NUCLEAR RESONANCE

17. W.GORDY,W.V.SMITH, AND R.F.TRAMBARULO,MICROWAVE SPECTROSCOPY, JOHN WILEY AND SONS INC.,NEW YORK(1953)

18. R.J.MYERS AND W.D.GWINN,ANN.REV.PHYS.CHEM.5,385-394(1954) THE MICROWAVE SPECTRA OF GASES

19. M.W.P.STRANDBERG,MICROWAVE SPECTROSCOPY,METHUEN AND COMPANY LTD. LONDON(1954) AND JOHN WILEY AND SONS INC.,NEW YORK(1954)

20. C.H.TOWNES AND A.L.SCHAWLOW,MICROWAVE SPECTROSCOPY,MCGRAW-HILL BOOK COMPANY INC.,NEW YORK(1955)

21. E.B.WILSON,JR.,J.C.DECIUS,AND P.C.CROSS,MOLECULAR VIBRATIONS, MCGRAW-HILL COMPANY INC.,NEW YORK(1955)

22. E.B.WILSON,JR.AND D.R.LIDE,JR.,DETERMINATION OF ORGANIC STRUCTURES BY PHYSICAL METHODS,CHAPTER 12,MICROWAVE SPECTROSCOPY, ACADEMIC PRESS INC.,NEW YORK(1955)

23. B.P.DAILEY,PHYSICAL METHODS IN CHEMICAL ANALYSIS 3,281-301 ACADEMIC PRESS INC.,NEW YORK(1956)

24. D.J.E.INGRAM,SPECTROSCOPY AT RADIO AND MICROWAVE FREQUENCIES, PHILOSOPHICAL LIBRARY INC.,NEW YORK(1956)

25. E.ROUBINE,CHIM.ANAL.38,402-409,428-431(1956) MICROWAVE SPECTROSCOPY OF GASES

26. J.H.N.LOUBSER,TYDSKR.WETENSKAP EN KUNS 17,166-174(1957) CHEMICAL ANALYSIS BY MICROWAVE SPECTROSCOPY

27. J.SHERIDAN,BOLL.SCI.FAC.CHIM.IND.BOLOGNA 16,71-79(1958) RECENT PROGRESS IN THE MICROWAVE SPECTROSCOPY OF GASES

28. J.SHERIDAN,RICERCA SCI.28,1801-1816(1958) SOME CONTRIBUTIONS OF MICROWAVE SPECTROSCOPY TO CHEMISTRY

29. L.A.BLYUMENFELD AND V.V.VOEVODSKII,VESTNIK AKAD.NAUK.S.S.S.R. 29, 16-21(1959) RADIOSPECTROSCOPY AND ITS APPLICATION IN CHEMISTRY

30. W.ZEIL,Z.ANAL.CHEM.170,19-29(1959) POSSIBLE USES OF MICROWAVE SPECTROSCOPY FOR QUALITATIVE AND QUANTITATIVE ANALYSIS

31. D.INGRAM,DISCOVERY(LONDON)23,29-35(1962) SPECTRA IN THE MICROWAVE REGION

32. W.MAIER,PURE APPL.CHEM.4,157-174(1962) MICROWAVE SPECTROSCOPY

33. E.B.WILSON,JR.,PURE AND APPL.CHEM.4,1-13(1962) VIBRATIONAL ROTATIONAL SPECTRA

34. H.C.ALLEN,JR. AND P.C.CROSS,MOLECULAR VIB-ROTORS,JOHN WILEY AND SONS INC.,NEW YORK(1963)

35. P.G.FAVERO,MICROWAVE GAS SPECTROSCOPY BIBLIOGRAPHY,1954-1962(1963)

36. L.KELLNER,SCIENTIA(MILAN)98,51-56(1963) MICROWAVE SPECTROSCOPY

37. W.MAIER,BER.BUNSENGES PHYSIK CHEM.67,539-553(1963) APPLICATIONS OF MICROWAVE SPECTROSCOPY IN PHYSICAL CHEMISTRY

38. D.J.MILLEN,CHEM.IND.(LONDON)1963,1472-1482(1963) DEVELOPMENT IN MICROWAVE SPECTROSCOPY

39. B.STARCK,BIBLIOGRAPHY OF RESEARCH IN THE MICROWAVE SPECTRA OF MOLECULES DURING THE YEARS(1945-1962),(1963)

40. E.B.WILSON,JR.,PURE APPL.CHEM.7,23-31(1963) RECENT RESULTS OF CHEMICAL INTEREST FROM MICROWAVE SPECTROSCOPY

41. G.W.KING,SPECTROSCOPY AND MOLECULAR STRUCTURE,HOLT,RINEHART,AND WINSTON,INC. NEW YORK(1964)

42. D.R.LIDE,JR.,ANN.REV.PHYS.CHEM.15,225-250(1964) MICROWAVE SPECTROSCOPY

43. K.SHIMODA, BEAM MASER SPECTROSCOPY AND APPLICATIONS,349-355 IN QUANTUM ELECTRONICS,PARIS 1963 CONFERENCE,COLUMBIA UNIVERSITY PRESS,NEW YORK(1964)

Section II. INSTRUMENTATION

A majority of microwave studies have been carried out using the conventional square-wave Stark-modulated microwave spectrometer[5, 11, 21, 24, 112] employing phase-sensitive detection and a reflex klystron source. Measurements have been extended from X-band up into the millimeter wave region through the use of harmonic generators and the development of high frequency tubes.[45, 46, 62, 63, 89, 93, 128] Sensitivity and resolution have been improved by frequency stabilization[1, 6-8] and to a greater degree by phase stabilization of the source.

The demonstration of maser principles led to their use in the study of rotational spectra. Very narrow line widths have been achieved with beam-maser spectrometers[100, 113] allowing the observation of hyperfine splittings which are too small to be resolved on a conventional spectrometer. Maser action has also been used to identify weak transitions when they have levels in common with stronger lines whose quantum numbers are known.[94, 106]

Although Stark effect spectrometers predominate, Zeeman effect studies [32, 33, 107] have been accomplished using a variety of cell designs. Other specialized microwave spectrometers include cells with "flow-through" systems for the study of short-lived free radicals, parallel plate absorption cells for precision dipole moment measurements,[72] radio frequency and microwave molecular beam devices,[73, 116, 119] and high-temperature cells.[31, 48, 51] Relative and absolute absorption intensities, as well as line width measurements, also require specialized system design.[85, 102, 111, 141] Millimeter wave transitions are being investigated as a possible source for a millimeter frequency standard.[122-126, 132-135]

1. R.V.POUND,REV.SCI.INSTR.17,490-505(1946) ELECTRONIC FREQUENCY STABILIZATION OF MICROWAVE OSCILLATORS

2. A.ROBERTS,Y.BEERS,AND A.G.HILL,PHYS.REV.70,112 (1946) THE MEASUREMENT OF NUCLEAR SPIN,MAGNETIC MOMENT,AND HYPERFINE STRUCTURE SEPARATION BY A MICROWAVE FREQUENCY MODULATION METHOD

3. R.L.CARTER AND W.V.SMITH,PHYS.REV.72,1265-1266(1947) MICROWAVE SPECTRUM FREQUENCY MARKERS

4. W.GORDY AND M.KESSLER,PHYS.REV.72,644(1947) A NEW ELECTRONIC SYSTEM FOR DETECTING MICROWAVE SPECTRA

5. R.H.HUGHES AND E.B.WILSON,JR.,PHYS.REV.71,562-563(1947) A MICROWAVE SPECTROGRAPH

6. R.V.POUND,PROC.INST.RADIO ENGRS.35,1405-1415(1947) FREQUENCY STABILIZATION OF MICROWAVE OSCILLATORS

7. R.V.POUND,(IN C.G.MONTGOMERY)TECHNIQUES OF MICROWAVE MEASUREMENTS, MCGRAW-HILL BOOK COMPANY,INC.,PP.58-78,NEW YORK(1947)

8. V.C.RIDEOUT,PROC.INST.RADIO ENGRS.35,767-771(1947) AUTOMATIC FREQUENCY CONTROL OF MICROWAVE OSCILLATORS

9. W.V.SMITH,J.L.G.DE QUEVEDO,R.L.CARTER,AND W.S.BENNETT, J.APPL.PHYS. 18,1112-1115(1947) FREQUENCY STABILIZATION OF MICROWAVE OSCILLATORS BY SPECTRUM LINES

10. R.J.WATTS AND D.WILLIAMS,PHYS.REV.72,1122-1123(1947) A DOUBLE MODULATION DETECTION METHOD FOR MICROWAVE SPECTRA

11. R.J.WATTS AND D.WILLIAMS,PHYS.REV.72,980-981(1947) A MODIFIED STARK-EFFECT MODULATION SPECTROGRAPH FOR MICROWAVES

12. W.D.HERSCHBERGER,J.APPL.PHYS.19,411-419(1948) MINIMUM DETECTABLE ABSORPTION IN MICROWAVE SPECTROSCOPY AND AN ANALYSIS OF THE STARK MODULATION METHOD

13. C.K.JEN,J.APPL.PHYS.19,649-653(1948) A METHOD FOR MEASURING THE COMPLEX DIELECTRIC CONSTANT OF GASES AT MICROWAVE FREQUENCIES BY USING A RESONANT CAVITY

14. R.KARPLUS,PHYS.REV.73,1027-1034(1948) FREQUENCY MODULATION IN MICROWAVE SPECTROSCOPY

15. R.KARPLUS AND J.SCHWINGER,PHYS.REV.73,1020-1026(1948) A NOTE ON SATURATION IN MICROWAVE SPECTROSCOPY

16. J.L.G.DE QUEVEDO AND W.V.SMITH,J.APPL.PHYS.19,831-836(1948) FREQUENCY STABILIZATION OF MICROWAVE OSCILLATORS BY SPECTRUM LINES II

17. C.H.TOWNES AND S.GESCHWIND,J.APPL.PHYS.19,795-796(1948) LIMITING SENSITIVITY OF A MICROWAVE SPECTROMETER

18. W.G.TULLER,W.C.GALLOWAY,AND F.P.ZAFFARANO,PROC.INST.RADIO ENGRS. 36,794-800(1948) RECENT DEVELOPMENTS IN FREQUENCY STABILIZATION

OF MICROWAVE OSCILLATORS

19. R.UNTERBERGER AND W.V.SMITH,REV.SCI.INSTR.19,580-585(1948) A MICROWAVE SECONDARY FREQUENCY STANDARD

20. L.C.HEDRICK,REV.SCI.INSTR.20,781-783(1949) A FLEXIBLE HIGH VOLTAGE SQUARE WAVE GENERATOR

21. K.B.MCAFEE,JR.,R.H.HUGHES,AND E.B.WILSON,JR.,REV.SCI.INSTR.20, 821-826(1949) A STARK-EFFECT MICROWAVE SPECTROGRAPH OF HIGH SENSITIVITY

22. D.H.BAIRD,R.M.FRISTROM, AND M.H.SIRVETZ,REV.SCI.INSTR.21,881(1950) STARK EFFECT ABSORPTION CELLS FOR MICROWAVE SPECTROSCOPY

23. T.R.HARTZ AND A.VAN DER ZIEL,PHYS.REV.78,473(1950) A SQUARE-WAVE MODULATION METHOD FOR MICROWAVE SPECTRA

24. A.H.SHARBAUGH,REV.SCI.INSTR.21,120-135(1950) THE DESIGN AND CONSTRUCTION OF A STARK-MODULATION MICROWAVE SPECTROGRAPH

25. I.TAKAHASHI,A.OKAYA,T.OGAWA,AND T.HASHI,MEM.COLLEGE SCIENCE,UNIV. KYOTO 26,113-121(1950) 1.5 CM WAVELENGTH MICROWAVE SPECTROSCOPE

26. E.S.DAYHOFF,REV.SCI.INSTR.22,1025-1026(1951) A FREQUENCY CONTROLLER FOR REFLEX KLYSTRONS

27. R.FREYMANN,PHYSICA 17,328-332(1951) REMARK ON THE ROTATIONAL METHOD AND THE METHOD OF PERTURBATIONS IN THE ULTRA-HERTZIAN REGION. APPARATUS FOR MEASURING THE ABSORPTION OF VAPORS FOR FREQUENCIES NEAR 10000 MC

28. L.C.HEDRICK,REV.SCI.INSTR.22,537(1951) SYNCHRONIZER FOR 100 KC SQUARE WAVE GENERATOR

29. G.NEWELL AND R.H.DICKE,PHYS.REV.83,1064-1065(1951) A METHOD FOR REDUCING THE DOPPLER BREADTH OF MICROWAVE ABSORPTION LINES

30. E.ROUBINE,REV.TECH.C.F.T.H.16,21-44(1951) REALIZATION OF A SPECTROSCOPE FOR MILLIMETER WAVES

31. L.J.RUEGER,H.LYONS,AND R.G.NUCKOLLS,REV.SCI.INSTR.22,428(1951) A HIGH TEMPERATURE BROAD-BAND STARK CELL FOR MICROWAVE SPECTROSCOPY

32. K.SHIMODA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 6,516-520(1951) A ZEEMAN MODULATION MICROWAVE SPECTROGRAPH OF HIGH SENSITIVITY

33. J.R.ESHBACH AND M.W.P.STRANDBERG,REV.SCI.INSTR.23,623-628(1952) APPARATUS FOR ZEEMAN EFFECT MEASUREMENTS ON MICROWAVE SPECTRA

34. S.GESCHWIND,ANN.N.Y.ACAD.SCI.55,751-773(1952) HIGH-RESOLUTION MICROWAVE SPECTROSCOPY

35. W.GORDY,ANN.N.Y.ACAD.SCI.55,774-788(1952) MICROWAVE SPECTROSCOPY ABOVE 60 KMC

36. R.H.HUGHES,ANN.N.Y.ACAD.SCI.55,872-890(1952) CHEMICAL ANALYSIS WITH THE MICROWAVE SPECTROGRAPH

37. H.R.JOHNSON,PHYS.REV.85,764 (1952) RESOLUTION AND SENSITIVITY OF MICROWAVE SPECTROGRAPHS

38. J.A.KLEIN,J.H.N.LOUBSER,A.H.NETHERCOT,AND C.H.TOWNES, REV.SCI. INSTR.23,78-82(1952) MAGNETRON HARMONICS AT MILLIMETER WAVELENGTHS

39. H.LYONS,ANN.N.Y.ACAD.SCI.55,831-871(1952) SPECTRAL LINES AS FREQUENCY STANDARDS

40. L.ESSEN,PROC.INST.ELEC.ENGRS.(LONDON),PT.III 100,19-24(1953) A HIGHLY STABLE MICROWAVE OSCILLATOR AND ITS APPLICATION TO THE MEASUREMENT OF THE SPATIAL VARIATIONS OF REFRACTIVE INDEX IN THE ATMOSPHERE

41. D.H.BAIRD AND G.R.BIRD,REV.SCI.INSTR.25,319-323(1954) A METHOD FOR THE ESTIMATION OF THE RELATIVE INTENSITIES OF MICROWAVE ABSORPTION LINES

42. G.R.BIRD,REV.SCI.INSTR.25,324-326(1954) NOTE ON THE ESTIMATION OF ABSOLUTE ABSORPTION INTENSITIES WITH A STARK-MODULATED MICROWAVE SPECTROGRAPH

43. R.J.COLLIER,REV.SCI.INSTR.25,1205-1207(1954) VARIABLE-FREQUENCY MICROWAVE CAVITY SPECTROMETER

44. W.A.HARDY,P.FLETCHER, AND V.SUAREZ,REV.SCI.INSTR.25,1135(1954) A MICROWAVE ABSORPTION CELL FOR REACTIVE MOLECULES

45. C.M.JOHNSON,D.M.SLAGER,AND D.D.KING,REV.SCI.INSTR.25,213-217(1954) MILLIMETER WAVES FROM HARMONIC GENERATORS

46. W.C.KING AND W.GORDY,PHYS.REV.93,407-412(1954) ONE-TO-TWO MILLIMETER WAVE SPECTROSCOPY. IV. EXPERIMENTAL METHODS AND RESULTS FOR OCS,CH3F,AND H2O

47. T.M.SANDERS,JR.,A.L.SCHAWLOW,G.C.DOUSMANIS,AND C.H.TOWNES, J.CHEM.PHYS.22,245-246(1954) EXAMINATION OF METHODS FOR DETECTING OH

48. M.L.STITCH,A.HONIG,AND C.H.TOWNES,REV.SCI.INSTR.25,759-764(1954) A HIGH-TEMPERATURE MICROWAVE SPECTROMETER

49. M.W.P.STRANDBERG AND H.DREICER,PHYS.REV.94,1393-1394(1954) DOPPLER LINE-WIDTH REDUCTION

50. M.W.P.STRANDBERG,H.R.JOHNSON,AND J.R.ESHBACH,REV.SCI.INSTR.25, 776-792(1954) APPARATUS FOR MICROWAVE SPECTROSCOPY

51. P.A.TATE AND M.W.P.STRANDBERG,REV.SCI.INSTR.25,956-958(1954) A SIMPLE HIGH-TEMPERATURE MICROWAVE SPECTROGRAPH

52. R.H.DICKE AND R.H.ROMER,REV.SCI.INSTR.26,915-928(1955) PULSE TECHNIQUES IN MICROWAVE SPECTROSCOPY

53. G.ERLANDSSON,ARKIV FYSIK 9,399-434(1955) A MICROWAVE SPECTROMETER AND ITS APPLICATIONS TO SOME ORGANIC MOLECULES

54. J.P.GORDON,PHYS.REV.99,1253-1263(1955) HYPERFINE STRUCTURE IN THE

INVERSION SPECTRUM OF N(14)H3 BY A NEW HIGH-RESOLUTION MICROWAVE SPECTROMETER

55. J.P.GORDON,H.J.ZEIGER,AND C.H.TOWNES,PHYS.REV.99,1264-1274(1955) THE MASER-NEW TYPE OF MICROWAVE AMPLIFIER,FREQUENCY STANDARD AND SPECTROMETER

56. A.OKAYA,REV.SCI.INSTR.26,1024-1028(1955) SOME DEVICES FOR STARK MODULATION MILLIMETER-WAVE SPECTROGRAPH

57. M.PETER AND M.W.P.STRANDBERG,PHYS.REV.99,667 (1955) MOLECULAR-BEAM MICROWAVE ABSORPTION SPECTROSCOPE

58. M.PETER AND M.W.P.STRANDBERG,PROC.INST.RADIO ENGRS.43,869-873(1955) PHASE STABILIZATION OF MICROWAVE OSCILLATORS

59. K.SHIMODA AND T.C.WANG,REV.SCI.INSTR.26,1148-1149(1955) NEW METHOD FOR THE OBSERVATION OF HYPERFINE STRUCTURE IN NH3 IN A --MASER-- OSCILLATOR

60. M.W.P.STRANDBERG AND M.PETER,PHYS.REV.133,963 (1955) PRECISION OF MICROWAVE SPECTROGRAPHS

61. J.BONANOMI AND J.HERRMANN,HELV.PHYS.ACTA 29,224-226(1956) AMMONIA FREQUENCY STANDARD

62. C.A.BURRUS,JR. AND W.GORDY,PHYS.REV.101,599-602(1956) MILLIMETER AND SUBMILLIMETER WAVE SPECTROSCOPY

63. M.COWAN AND W.GORDY,PHYS.REV.104,551-552(1956) FURTHER EXTENSION OF MICROWAVE SPECTROSCOPY IN THE SUB-MILLIMETER REGION

64. G.ERLANDSSON AND H.SELEN,ARKIV FYSIK 11,391-393(1956) FREQUENCY MEASUREMENTS IN MICROWAVE SPECTROSCOPY

65. J.HERRMANN AND J.BONANOMI,HELV.PHYS.ACTA 29,448-451(1956) SPECIAL ARRANGEMENT FOR MICROWAVE SPECTROSCOPY IN A CAVITY RESONATOR

66. W.R.HOISINGTON,C.KELLNER,AND M.J.PENTZ,NATURE 178,1111-1112(1956) HIGH-RESOLUTION MICROWAVE ZEEMAN SPECTROMETER

67. J.BONANOMI,J.DE PRINS,J.HERRMANN,AND P.KARTASCHOFF,HELV.PHYS.ACTA 30,290-292(1957) MICROWAVE SPECTROGRAPH OF HIGH RESOLUTION

68. E.B.BRACKETT,P.H.KASAI,AND R.J.MYERS,REV.SCI.INSTR.28,699-702(1957) DIELECTRIC ROD WAVE-GUIDE CELLS FOR MICROWAVE SPECTROSCOPY

69. C.C.COSTAIN,CAN.J.PHYS.35,241-247(1957) A --FREE SPACE -- ABSORPTION CELL FOR MICROWAVE SPECTROSCOPY

70. E.F.DAVIS,EXTERNAL PUBLICATION NO.380,UNIV. CALIFORNIA JET PROPULSION LAB.,JUNE,1957

71. A.K.GARRISON AND W.GORDY,PHYS.REV.108,899-900(1957) HIGH TEMPERATURE MOLECULAR BEAM MICROWAVE SPECTROMETER

72. S.A.MARSHALL AND J.WEBER,REV.SCI.INSTR.28,134-137(1957) PLANE PARALLEL PLATE TRANSMISSION LINE STARK MICROWAVE SPECTROGRAPH

73. M.PETER AND M.W.P.STRANDBERG,MIT RESEARCH LAB. ELECTRONICS TECHNICAL REPORT 336(1957) THEORETICAL AND EXPERIMENTAL STUDY OF MOLECULAR-BEAM MICROWAVE SPECTROSCOPY

74. M.C.THOMPSON AND J.V.CATEORA, REV.SCI.INSTR. 28,656(1957) HIGH-ORDER HARMONICS FOR X-BAND OSCILLATOR STABILIZATION

75. I.R.HURLE AND T.M.SUGDEN,J.SCI.INSTR.35,319-323(1958) MICROWAVE SPECTROMETER FOR THE STUDY OF FREE RADICALS

76. R.D.MATTUCK AND M.W.P.STRANDBERG,REV.SCI.INSTR.29,717-721(1958) MICROMODULATOR. A DEVICE FOR MEASURING THE INTENSITIES OF MICROWAVE ABSORPTION LINES

77. J.M.RICHARDSON,J.APPL.PHYS.29,137-145(1958) EXPERIMENTAL EVALUATION OF THE OXYGEN MICROWAVE ABSORPTION AS A POSSIBLE ATOMIC FREQUENCY STANDARD

78. M.C.THOMPSON,M.J.VETTER,AND D.M.WATERS,ELECTRONICS 31,100-101(1958) SHF FREQUENCY STANDARD USES DOUBLE CONVERSION

79. P.H.VERDIER,REV.SCI.INSTR.29,646-647(1958) STARK EFFECT ,RESONANT CAVITY MICROWAVE SPECTROGRAPH

80. P.H.VERDIER AND E.B.WILSON,JR.,J.CHEM.PHYS.29,340-347(1958) RELATIVE INTENSITIES OF MICROWAVE ABSORPTION LINES

81. Y.BEERS,REV.SCI.INSTR.30,9-16(1959) THEORY OF THE CAVITY MICROWAVE SPECTROMETER AND MOLECULAR FREQUENCY STANDARD

82. F.BRUIN AND D.VAN LADESTEYN,PHYSICA 25,1-8(1959) FREQUENCY STABILIZATION OF A REFLEX KLYSTRON OSCILLATOR

83. H.E.BUSSY AND G.BIRNBAUM,REV.SCI.INSTR.30,800-804(1959) CAVITY RESONATORS FOR SPECTROSCOPY OF COMPRESSED GASES

84. J.H.CORN,ELECTRONICS 32,74(1959) MICROWAVE MEASUREMENT

85. A.DYMANUS,PHYSICA 25,859-888(1959) INTENSITY MEASUREMENTS IN MICROWAVE SPECTROSCOPY. THE --ANTIMODULATION-- METHOD

86. A.DYMANUS,REV.SCI.INSTR.30,191-195(1959) HIGH-Q STARK CAVITY ABSORPTION CELL FOR MICROWAVE SPECTROMETERS

87. J.J.GALLAGHER AND J.B.NEWMAN,SPECTROCHIM.ACTA 15,769(1959) A GAS MASER AT MILLIMETER WAVELENGTHS

88. L.GENZEL,H.HAPP,AND R.WEBER,Z.PHYSIK 154,1-12(1959) A GRATING SPECTROMETER FOR THE REGION OF THE FAR INFRARED AND SHORT MICROWAVES

89. W.GORDY,PROC.SYM. MILLIMETER WAVES,1-23,INTERSCIENCE,NEW YORK,(1959) MILLIMETER AND SUBMILLIMETER WAVES IN PHYSICS

90. J.HERVE,J.PESCIA,AND M.SAUZADE,COMPT.REND.249,1486-1488(1959) FREQUENCY STABILIZATION OF A CARCINOTRON OF GREAT POWER

91. D.ILIAS,J.PHYS.RADIUM 20,653-655(1959) A RECORDING MICROWAVE SPECTROMETER FOR GAS STUDY

92. M.W.LONG,U.S.DEPT.COM.,OFFICE TECH.SERV.PB REPT.147,451,(1959) SENSITIVITY OF MICROWAVE SPECTROMETERS AND HYPERFINE SPECTRA OF CFCL3

93. R.S.OHL,P.P.BUDENSTEIN,AND C.A.BURRUS,REV.SCI.INSTR.30,765-774(1959) IMPROVED DIODE FOR THE HARMONIC GENERATION OF MILLIMETER AND SUBMILLIMETER WAVES

94. K.SHIMODA,J.PHYS.SOC.JAPAN 14,954-959(1959) RADIOFREQUENCY SPECTROSCOPY USING THREE-LEVEL MASER ACTION

95. R.W.ZIMMER,REV.SCI.INSTR.30,1052-1053(1959) TRANSISTOR PHASE DETECTOR FOR PHASE-LOCK STABILIZATION OF A 30000-MC KLYSTRON

96. A.DYMANUS AND A.BOUWKNEGT,PHYSICA 26,115-126(1960) MEASUREMENTS ON POWER-CONVERSION GAIN AND NOISE RATIO OF THE 1N26 CRYSTAL RECTIFIERS

97. A.DYMANUS,H.A.DIJKERMAN,AND G.R.D.ZIJDERVELD,J.CHEM.PHYS.32,717-723 (1960) NEW METHOD FOR THE MEASUREMENT OF MICROWAVE INTEGRATED LINE INTENSITIES AND LINE WIDTHS

98. G.ERLANDSSON AND A.RACHMAN,CIENCIA E INVEST.16,166-176(1960) MICROWAVE SPECTROPHOTOMETER WITH STARK MODULATION

99. J.A.GIORDMAINE AND T.C.WANG,J.APPL.PHYS.31,463-471(1960) MOLECULAR BEAM FORMATION BY LONG PARALLEL TUBES

100. J.P.GORDON,QUANTUM ELECTRONICS,COLUMBIA UNIVERSITY PRESS,PP.3-16 NEW YORK(1960) MOLECULAR BEAM MASERS

101. M.W.LONG,REV.SCI.INSTR.31,1286-1289(1960) DETECTORS FOR MICROWAVE SPECTROMETERS

102. E.A.RINEHART,H.KLEEN,AND C.C.LIN,J.MOL.SPECTRY.5,458-473(1960) MEASUREMENT OF THE WIDTHS OF MICROWAVE SPECTRAL LINES

103. H.D.RUDOLPH,H.DREIZLER,AND W.MAIER,Z.NATURFORSCH 15A,274-275(1960) MICROWAVE SPECTRUM OF METHANOL BETWEEN 9 AND 16 X 10 MC BY USING THE CARCINOTRON AS RADIATION SOURCE

104. K.SHIMODA,H.TAKUMA,AND T.SHIMIZU,J.PHYS.SOC.JAPAN 15,2036-2041(1960) BEAM-TYPE MASERS FOR RADIOFREQUENCY SPECTROSCOPY

105. P.THADDEUS,J.LOUBSER,A.JAVAN,L.KRISHER,AND H.LECAR,QUANTUM ELECTRONICS SYMPOSIUM,HIGH VIEW ,NEW YORK 1959,47-56(1960) USE OF SOME NEW MOLECULES IN A BEAM-TYPE MASER FOR SPECTROSCOPY AND FREQUENCY STANDARDS

106. T.YAJIMA AND K.SHIMODA,J.PHYS.SOC.JAPAN 15,1668-1675(1960) THE THREE LEVEL GAS MASER AS A MICROWAVE SPECTROMETER

107. R.W.ZIMMERER, REV.SCI.INSTR.31,106-111(1960) PRECISION ZEEMAN MODULATION SPECTROMETER

108. A.BATTAGLIA,A.GOZZINI,AND E.POLACCO,ARCH.SCI.(GENEVA) 13,171-177 (1961) A NEW METHOD FOR MODULATION OF MOLECULAR ABSORPTION IN MICROWAVE SPECTROSCOPY. STUDY OF THE TRANSITION J=0-1 OF OCS

109. Y.BEERS,REV.SCI.INSTR.32,23-27(1961) COMPARISON OF THE SENSITIVITY OF THE BEAM MASER AND CAVITY ABSORPTION SPECTROMETERS

110. A.DYMANUS AND H.A.DIJKERMAN,PHYSICA 27,593-602(1961) THE σ -STARK EFFECT OF ROTATIONAL TRANSITIONS. I. EXPERIMENTAL ASPECTS

111. E.A.RINEHART AND C.C.LIN,REV.SCI.INSTR.32,562-563(1961) SENSITIVE TRIPLE MODULATION METHOD FOR MEASURING WIDTHS OF MICROWAVE SPECTRAL LINES

112. H.D.RUDOLPH,Z.ANGEW.PHYSIK 13,401-409(1961) STARK-EFFECT MICROWAVE SPECTROGRAPH WITH HIGH RESOLVING POWER

113. P.THADDEUS AND L.C.KRISHER,REV.SCI.INSTR.32,1083-1089(1961) A BEAM MASER SPECTROMETER

114. H.W.DE WIJN,REV.SCI.INSTR.32,735-736(1961) HIGH VOLTAGE SQUARE WAVE GENERATOR

115. J.J.GALLAGHER,J.W.DEES,R.G.STRAUCH,AND R.E.CUPP,FIRST QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1962) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

116. A.J.HEBERT,UCRL-10482(1962), A MOLECULAR-BEAM ELECTRIC-RESONANCE SPECTROMETER AND THE RADIO-FREQUENCY SPECTRA OF LITHIUM FLUORIDE

117. A.NARATH AND W.D.GWINN,REV.SCI.INSTR.33,79-82(1962) PHASE-STABILIZED KLYSTRON SYSTEM AND ITS APPLICATION TO MICROWAVE SPECTROSCOPY AND MICROWAVE FREQUENCY STANDARDS

118. T.NISHIKAWA,KAGAKU NO RYOIKI 16,657-664(1962) DEVELOPMENTS IN THE MILLIMETER AND SUBMILLIMETER WAVE TECHNIQUE AND ITS APPLICATION IN CHEMISTRY

119. J.R.RUSK AND W.GORDY,PHYS.REV.127,817-830(1962) MILLIMETER WAVE MOLECULAR BEAM SPECTROSCOPY-ALKALI BROMIDES AND IODIDES

120. J.SHERIDAN,A.P.COX,AND J.K.TYLER,U.S.DEPT.COM.,OFFICE TECH.SERV. AD 273,614, 28 PP.(1962) MICROWAVE SPECTROSCOPY

121. A.S.ESBITT AND E.B.WILSON,JR.,REV.SCI.INSTR.34,901-907(1963) RELATIVE INTENSITY MEASUREMENTS IN MICROWAVE SPECTROSCOPY

122. J.J.GALLAGHER AND R.G.STRAUCH,SECOND QUARTERLY PROGRESS REPORT, MARTIN COMPANY(1963) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

123. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,THIRD QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1963) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

124. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,FOURTH QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1963) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

125. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,FIFTH QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1963) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

126. M.LICHTENSTEIN,J.J.GALLAGHER,AND R.E.CUPP,REV.SCI.INSTR.34,843-846 (1963) MILLIMETER SPECTROMETER USING A FABRY-PEROT INTERFEROMETER

127. R.L.POYNTER AND G.R.STEFFENSEN,REV.SCI.INSTR.34,77-82(1963) TUNABLE,HIGH STABILITY,MICROWAVE OSCILLATOR

128. THE MICROWAVE ENGINEERS HANDBOOK AND BUYERS GUIDE-1964,HORIZON HOUSE,MICROWAVE INC.,DEDHAM,MASS.,DECEMBER(1963)

129. R.W.ZIMMERER,M.V.ANDERSON,G.L.STRINE AND Y.BEERS,IEEE TRANS. MICROWAVE THEORY AND TECHNIQUES 11,142-149(1963) MILLIMETER WAVELENGTH RESONANT STRUCTURES

130. A.BENJAMINSON,MICROWAVE JOURNAL 7,NO.12,65-69(1964) PHASE-LOCKED MICROWAVE OSCILLATOR SYSTEMS WITH 0.1 CPS STABILITY

131. P.L.CLOUSER AND W.GORDY,PHYS.REV.134,863-870(1964) MILLIMETER-WAVE MOLECULAR BEAM SPECTROSCOPY-ALKALI CHLORIDES

132. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,SIXTH QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1964) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

133. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,SEVENTH QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1964) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

134. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP,EIGHTH QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1964) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

135. J.J.GALLAGHER,R.G.STRAUCH,AND R.E.CUPP, NINTH QUARTERLY PROGRESS REPORT,MARTIN COMPANY(1964) EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS

136. Y.HANYU,NIPPON KAGAKU ZASSHI 85,5-8(1964) CONSTRUCTION OF A STARK-MODULATED MICROWAVE SPECTROMETER AND THE SPECTRUM OF A HYDROGEN-BONDED SYSTEM OF ACETIC ACID AND TRIFLUOROACETIC ACID

137. H.W.HARRINGTON AND R.H.BAUHAUS,MOLECULAR SPECTROSCOPY SYMPOSIUM, OHIO STATE UNIV.(1964) ABSOLUTE INTENSITY COEFFICIENT MEASUREMENTS IN MICROWAVE SPECTROSCOPY

138. D.R.LIDE,JR.,REV.SCI.INSTR.35,1226(1964) VERSATILE STARK WAVEGUIDE FOR MICROWAVE SPECTROSCOPY

139. R.G.STRAUCH,R.E.CUPP,M.LICHTENSTEIN AND J.J.GALLAGHER, SYMPOSIUM ON QUASI-OPTICS,POLYTECHNIC INST. OF BROOKLYN(1964) QUASI-OPTICAL TECHNIQUES IN MILLIMETER SPECTROSCOPY

140. F.L.WENTWORTH,J.W.DOZIER,AND J.D.RODGERS,MICROWAVE JOURNAL 7,69-75 (1964) MILLIMETER WAVE HARMONIC GENERATORS,MIXERS AND DETECTORS

141. E.A.RINEHART,R.L.LEGAN,AND C.C.LIN,REV.SCI.INSTR.36,511-517 (1965) MICROWAVE SPECTROGRAPH FOR LINEWIDTH MEASUREMENTS

Section III. LINE SHAPE AND LINE BROADENING

1. H.A.LORENTZ,PROC.AMST.AKAD.SCI.8,591-611(1906) ABSORPTION AND EMISSION LINES OF GASES

2. V.F.WEISSKOPF,PHYS.ZEITS. 34,1-24(1933) WIDTH OF SPECTRAL LINES IN GASES

3. H.KUHN,PHIL.MAG.18,987-1003(1934) PRESSURE SHIFT AND BROADENING OF SPECTRAL LINES

4. H.KUHN AND F.LONDON,PHIL.MAG.18,983-987(1934) LIMITATION OF THE POTENTIAL THEORY OF BROADENING OF SPECTRAL LINES

5. H.MARGENAU AND D.T.WARREN,PHYS.REV.51,748-753(1937) LONG RANGE INTERACTIONS BETWEEN DIPOLE MOLECULES

6. L.SPITZER,JR.,PHYS.REV.58,348-357(1940) IMPACT BROADENING OF SPECTRAL LINES

7. A.JABLONSKI,PHYS.REV.68,78-93(1945) GENERAL THEORY OF PRESSURE BROADENING OF SPECTRAL LINES. ERRATA-PHYS.REV.69,31(1946)

8. J.H.VAN VLECK AND V.F.WEISSKOPF,REVS.MOD.PHYS.17,227-236(1945) ON THE SHAPE OF COLLISION-BROADENED LINES

9. H.M.FOLEY,PHYS.REV.69,616-628(1946) THE PRESSURE BROADENING OF SPECTRAL LINES

10. H.FROHLICH,NATURE 157,478(1946) SHAPE OF COLLISION-BROADENED SPECTRAL LINES

11. A.JABLONSKI,PHYSICAS GRAV.7,541-551(1946) PRESSURE BROADENING OF SPECTRAL LINES

12. E.LINDHOLM,ARK.MAT.ASTRON FYSIK 32A,PAPER 17(1946) PRESSURE BROADENING OF SPECTRAL LINES

13. C.H.TOWNES,PHYS.REV.70,665-671(1946) THE AMMONIA SPECTRUM AND LINE SHAPES NEAR 1.25 CM WAVE-LENGTH

14. B.BLEANEY AND R.P.PENROSE,PROC.PHYS.SOC.59,418-428(1947) COLLISION BROADENING OF THE INVERSION SPECTRUM OF AMMONIA AT CENTIMETER WAVE-LENGTHS. I. SELF-BROADENING AT HIGH PRESSURE

15. T.A.POND AND W.F. CANNON,PHYS.REV.72,1121-1122(1947) SATURATION EFFECT IN MICROWAVE SPECTRUM OF AMMONIA

16. B.BLEANEY AND J.H.N.LOUBSER,NATURE 161,522-523(1948) COLLISION BROADENING OF THE AMMONIA INVERSION SPECTRUM AT HIGH PRESSURES

17. B.BLEANEY AND R.P.PENROSE, PROC.PHYS.SOC.LONDON 60,540-549(1948) COLLISION BROADENING OF THE INVERSION SPECTRUM OF AMMONIA. III. THE COLLISION CROSS SECTIONS FOR SELF-BROADENING AND FOR MIXTURES WITH NON-POLAR GASES

18. H.M.FOLEY,PHYS.REV.73,259(1948) THE THEORY OF THE PRESSURE BROADENING OF SPECTRAL LINES-A REPLY.

19. A.JABLONSKI,PHYS.REV.73,258-259(1948) ON THE PHASE SHIFT APPROXIMATION IN THE THEORY OF PRESSURE BROADENING OF SPECTRAL LINES

20. D.F.SMITH,PHYS.REV.74,506-507(1948) PRESSURE BROADENING IN AMMONIA AT CENTIMETER WAVE-LENGTHS

21. P.W.ANDERSON,PHYS.REV.75,1450(1949) ON THE ANOMALOUS LINE-SHAPES IN THE AMMONIA INVERSION SPECTRUM AT HIGH PRESSURES

22. P.W.ANDERSON,PHYS.REV.76,647-661(1949) PRESSURE BROADENING IN THE MICROWAVE AND INFRARED REGIONS

23. H.MARGENAU,PHYS.REV.76,121-124(1949) PRESSURE BROADENING IN THE INVERSION SPECTRUM OF AMMONIA

24. H.MARGENAU,PHYS.REV.76,1423-1429(1949) INVERSION FREQUENCY OF AMMONIA AND MOLECULAR INTERACTION

25. J.H.VAN VLECK AND H.MARGENAU,PHYS.REV.76,1211-1214(1949) COLLISION THEORIES OF PRESSURE BROADENING OF SPECTRAL LINES

26. P.W.ANDERSON,PHYS.REV.80,511-513(1950) PRESSURE BROADENING OF THE AMMONIA INVERSION LINE BY FOREIGN GASES. QUADRUPOLE-INDUCED DIPOLE INTERACTIONS

27. T.HOLSTEIN,PHYS.REV.79,744(1950) PRESSURE BROADENING OF SPECTRAL LINES

28. R.R.HOWARD AND W.V.SMITH,PHYS.REV.77,840-841(1950) TEMPERATURE DEPENDENCE OF MICROWAVE LINE WIDTHS

29. L.C.JONES,PHYS.REV.77,741 (1950) PRESSURE BROADENING AND THE LINE SHIFT IN MICROWAVE SPECTRA

30. H.MARGENAU AND S.BLOOM,PHYS.REV.79,213 (1950) PRESSURE BROADENING OF SPECTRAL LINES AND FREQUENCY MODULATION

31. W.V.SMITH AND R.R.HOWARD,PHYS.REV.79,132-136(1950) MICROWAVE COLLISION DIAMETERS. II. THEORY AND CORRELATION WITH MOLECULAR QUADRUPOLE MOMENTS

32. B.V.GOKHALE AND M.W.P.STRANDBERG,PHYS.REV.84,844(1951) LINE BREADTHS IN THE 5-MM MICROWAVE ABSORPTION OF OXYGEN

33. R.M.HILL AND W.V.SMITH,PHYS.REV.82,451(1951) MICROWAVE COLLISION DIAMETERS AND ASSOCIATED QUADRUPOLE MOMENTS

34. D.C.M.LESLIE,PHIL.MAG.42,37-55(1951) COLLISION BROADENING OF MICROWAVE FREQUENCIES

35. H.MARGENAU,PHYS.REV.82,156-158(1951) STATISTICAL THEORY OF PRESSURE BROADENING

36. M.MIZUSHIMA,PHYS.REV.83,94-103(1951) THE THEORY OF PRESSURE BROADENING AND ITS APPLICATION TO MICROWAVE SPECTRA ERRATA-PHYS.REV.84,363(1951)

37. C.A.POTTER,A.V.BUSHKOVITCH,AND A.G.ROUSE,PHYS.REV.83,987-989(1951) PRESSURE BROADENING IN THE MICROWAVE SPECTRUM OF AMMONIA

38. R.S.ANDERSON,W.V.SMITH,AND W.GORDY,PHYS.REV.87,561-568(1952) LINE-BREADTHS OF THE MICROWAVE SPECTRUM OF OXYGEN

39. W.V.SMITH,ANN.N.Y.ACAD.SCI.55,891-903(1952) PRESSURE BROADENING

40. R.S.ANDERSON,PHYS.REV.97,1654-1660(1955) VARIATION OF LINE WIDTH WITH ROTATIONAL STATE AND TEMPERATURE IN THE MICROWAVE SPECTRUM OF OCS

41. E.P.GROSS,PHYS.REV.97,395-403(1955) SHAPE OF COLLISION-BROADENED SPECTRAL LINES

42. C.S.G.PHILLIPS,J.CHEM.PHYS.23,2388-2394(1955) LINE BROADENING AND DIELECTRIC RELAXATION IN COMPRESSED GASES

43. W.V.SMITH,H.A.LACKNER,AND A.B.VOLKOV,J.CHEM.PHYS.23,389-396(1955) PRESSURE BROADENING (OF MICROWAVE LINES) OF LINEAR MOLECULES. II. THEORY ERRATA-J.CHEM.PHYS.23,1559(1955)

44. M.TINKHAM AND M.W.P.STRANDBERG,PHYS.REV.99,537-539(1955) LINE BREADTHS IN THE MICROWAVE MAGNETIC RESONANCE SPECTRUM OF OXYGEN

45. A.A.KOLOSOV AND L.L.MYASNIKOV,OPTIKA I SPEKTROSKOPIYA 1,374-377(1956) THE HALF-WIDTHS OF THE ABSORPTION MICRORADIOWAVE LINES OF AMMONIA

46. W.V.SMITH,J.CHEM.PHYS.25,510-515(1956) EVALUATION OF MOLECULAR QUADRUPOLE MOMENTS FROM MICROWAVE SPECTRAL LINE WIDTHS. I. THEORETICAL

47. V.M.FAIN,SOVIET PHYS.JETP 5,501-503(1957) NATURAL LINE WIDTHS OF MICROWAVES

48. H.FEENY,W.MADIGOSKY,AND B.WINTERS,J.CHEM.PHYS.27,898-900(1957) EVALUATION OF MOLECULAR QUADRUPOLE MOMENTS FROM MICROWAVE LINE BREADTHS. II. EXPERIMENTAL

49. KRISHNAJI AND G.P.SRIVASTAVA,PROC.PHYS.SOC.(LONDON)70B,621-622 (1957) TEMPERATURE VARIATION OF MICROWAVE ABSORPTION COEFFICIENT IN ETHYL CHLORIDE

50. K.MATSUURA,Y.SUGIURA,AND G.M.HATOYAMA,J.PHYS.SOC.JAPAN 12,314(1957) FREQUENCY SHIFT IN AMMONIA ABSORPTION DUE TO SELF-BROADENING

51. K.MATSUURA,Y.SUGIURA,AND G.M.HATOYAMA,DENKI SHIKENSHO THO 21,612-621 (1957) FREQUENCY SHIFT IN THE ABSORPTION LINE OF AMMONIA IN THE MICROWAVE REGION

52. I.TAKAHASHI,T.OGAWA,M.YAMANO,AND A.HIRAI,PHYS.REV.106,606(1957) SHIFT OF CENTER FREQUENCY OF AN AMMONIA INVERSION SPECTRUM

53. K.TOMITA,PROGR.THEORET.PHYS.(KYOTO) 18,316-318(1957) PRESSURE SHIFT OF THE INVERSION FREQUENCY OF AMMONIA

54. L.J.KIEFFER AND A.V.BUSHKOVITCH,J.MOL.SPECTRY. 2,558-565(1958) CRITICAL ANALYSIS AND APPLICATIONS OF A QUASI-RESONANT THEORY OF PRESSURE BROADENING OF LINEAR MOLECULES

55. A.BATTAGLIA,A.GOZZINI,AND E.POLACCO,NUOVO CIMENTO 14,1076-1081(1959)

SOME PHENOMENA RELATED TO THE SATURATION OF ROTATIONAL RESONANCES IN THE MICROWAVE SPECTRUM OF COS

56. W.S.BENEDICT AND C.D.KAPLAN,J.CHEM.PHYS.30,388-399(1959) CALCULATION OF LINE WIDTHS IN H2O-N2 COLLISIONS

57. A.DYMANUS,PHYS.REV.116,351-355(1959) POWER SATURATION OF THE J=1-2 ROTATIONAL TRANSITION OF OCS

58. J.E.BOGGS,A.P.DEAM,AND J.M.KING,J.CHEM.PHYS.33,1852-1855(1960) TEMPERATURE VARIATION OF THE LINEWIDTH IN NONRESONANT MICROWAVE ABSORPTION

59. J.A.FULFORD,NATURE 188,1097-1098(1960) LINE BREADTHS IN THE AMMONIA SPECTRUM

60. R.G.BREENE,JR.,THE SHIFT AND SHAPE OF SPECTRAL LINES,PERGAMON PRESS NEW YORK(1961)

61. G.BIRNBAUM AND A.A.MARYOTT,J.CHEM.PHYS.36,2032-2036(1962) COLLISION-INDUCED MICROWAVE ABSORPTION IN COMPRESSED GASES II. MOLECULAR ELECTRIC QUADRUPOLE MOMENTS

62. A.A.MARYOTT AND G.BIRNBAUM,J.CHEM.PHYS.36,2026-2032(1962) COLLISION-INDUCED MICROWAVE ABSORPTION IN COMPRESSED GASES. I. DEPENDENCE ON DENSITY,TEMPERATURE,AND FREQUENCY IN CO2

63. M.L.SAGE,U.S.DEPT.COM.OFFICE TECH.SERV.AD 284,174,14PP.(1962) PRESSURE BROADENING AND THE ELECTRIC QUADRUPOLE MOMENT OF OCS

64. L.GALATRY,J.PHYS.RADIUM 24,265-272(1963) THEORY OF SPECTRAL LINE SHAPE IN THE MICROWAVE REGION

65. KRISHNAJI AND S.CHANDRA,J.CHEM.PHYS.38,232-236(1963) MOLECULAR INTERACTION AND LINEWIDTH OF ASYMMETRIC MOLECULE SO2. I.SO2-N2 COLLISIONS

66. KRISHNAJI AND S.CHANDRA,J.CHEM.PHYS.38,2690-2692(1963) MOLECULAR INTERACTION AND LINE WIDTH OF ASYMMETRIC MOLECULE SO2. III. SO2-CH3BR AND SO2-SO2 COLLISIONS

67. G.BIRNBAUM,OPTICAL MASERS,ACADEMIC PRESS INC.,NEW YORK(1964)

68. G.BIRNBAUM AND A.A.MARYOTT,J.CHEM.PHYS.41,154-157(1964) NON-RESONANT ABSORPTION AND COLLISION DIAMETERS IN THE FOREIGN-GAS BROADENING OF SYMMETRIC TOP MOLECULES

69. KRISHNAJI AND S.L.SRIVASTAVA,J.CHEM.PHYS.41,2201(1964) QUADRUPOLE MOMENT OF OCS

70. KRISHNAJI AND S.L.SRIVASTAVA,J.CHEM.PHYS.41,2266-2270(1964) FIRST-ORDER LONDON DISPERSION FORCES AND MICROWAVE SPECTRAL LINEWIDTH

Section IV. THE RIGID ROTOR

Calculation and characterization of the energy levels and wave functions of the rigid rotor immediately followed the introduction of the new quantum theory.[1-5] Application of group theory to the problem[6,9] considerably simplifies the computational difficulties presented by the asymmetric rotor whose energy levels cannot be expressed in a closed form except for low J values. Since the formulation of the reduced energy $E(\kappa)$,[8,9] the original tabulations of this parameter[9,17,22] have been extended to high J values for smaller intervals of κ through the use of high-speed digital computers.[19,47,49-53] Approximate methods were also developed,[11,12] particularly for near symmetric top molecules.[25-27,41,42] Considerable attention has also been given to the calculation of theoretical line intensities.[10,18,32]

1. F.REICHE AND H.RADEMACHER,Z.PHYSIK 39,444-464(1926) QUANTIZATION OF A SYMMETRICAL TOP ACCORDING TO SCHROEDINGERS UNDULATION MECHANICS

2. R.L.KRONIG AND I.I.RABI,PHYS.REV.29,262-269(1927) THE SYMMETRICAL TOP IN THE UNDULATORY MECHANICS

3. H.RADEMACHFR AND F.REICHE,Z.PHYSIK 41,453-492(1927) QUANTIZATION OF THE SYMMETRICAL TOP ACCORDING TO SCHROEDINGERS UNDULATION MECHANICS

4. E.E.WITMER,PROC.NAT.ACAD.SCI.13,60-65(1927) THE QUANTIZATION OF THE ROTATIONAL MOTION OF THE POLYATOMIC MOLECULE BY THE NEW WAVE MECHANICS

5. H.A.KRAMERS AND G.P.ITTMANN,Z.PHYSIK 53,553-565(1929) ON THE QUANTIZATION OF THE ASYMMETRIC TOP

6. S.C.WANG,PHYS.REV.34,243-252(1929) ON THE ASYMMETRICAL TOP IN QUANTUM MECHANICS

7. H.B.G.CASIMIR,ROTATION OF A RIGID BODY IN QUANTUM MECHANICS, J.B.WOLTERS,THE HAGUE(1931)

8. B.S.RAY,Z.PHYSIK 78,74-91(1932) EIGENVALUES OF AN ASYMMETRICAL ROTATOR

9. G.W.KING,R.M.HAINER,AND P.C.CROSS,J.CHEM.PHYS.11,27-42(1943) THE ASYMMETRIC ROTOR. I. CALCULATION AND SYMMETRY CLASSIFICATION OF ENERGY LEVELS.

10. P.C.CROSS,R.M.HAINER,AND G.W.KING,J.CHEM.PHYS.12,210-225(1944) THE ASYMMETRIC ROTOR. II. CALCULATION OF DIPOLE INTENSITIES AND LINE CLASSIFICATION

11. G.W.KING,J.CHEM.PHYS.15,820-830(1947) THE ASYMMETRIC ROTOR. VI.CALCULATION OF HIGHER LEVELS BY MEANS OF THE CORRESPONDENCE PRINCIPLE

12. S.GOLDEN,J.CHEM.PHYS.16,78-86(1948) AN ASYMPTOTIC EXPRESSION FOR THE ENERGY LEVELS OF THE RIGID ASYMMETRIC ROTOR

13. R.KARPLUS,J.CHEM.PHYS.16,1170-1171(1948) NOTE ON THE ENERGY OF A ROTATING MOLECULE

14. E.E.WITMER,PHYS.REV.74,1247 (1948) AN EXPLICIT SOLUTION OF THE PROBLEM OF THE ASYMMETRIC ROTATOR ACCORDING TO QUANTUM MECHANICS

15. E.E.WITMER,PHYS.REV.74,1250 (1948) AN EXPLICIT FORMULA FOR THE ENERGY LEVELS OF THE ASYMMETRIC ROTATOR ACCORDING TO QUANTUM MECHANICS

16. S.GOLDEN AND J.K.BRAGG,J.CHEM.PHYS.17,439-441(1949) AN ASYMTOTIC EXPRESSION FOR THE ENERGY LEVELS OF THE ASYMMETRIC ROTOR. III. APPROXIMATION FOR THE ESSENTIALLY DEGENERATE LEVELS OF THE RIGID ROTOR

17. R.M.HAINER,P.C.CROSS, AND G.W.KING,J.CHEM.PHYS.17,826-836(1949) THE ASYMMETRIC ROTOR. VII. EXTENSION OF THE CALCULATION OF ENERGY LEVELS

18. D.R.LIDE,JR.,J.CHEM.PHYS.20,1761-1763(1952) A NOTE ON ROTATIONAL LINE STRENGTHS IN SLIGHTLY ASYMMETRIC ROTORS

19. B.L.HICKS,T.E.TURNER,AND W.W.WIDULE,J.CHEM.PHYS.21,564(1953) APPLICATIONS OF LARGE DIGITAL COMPUTERS TO CALCULATIONS OF MICROWAVE SPECTROSCOPY

20. D.KIVELSON,J.CHEM.PHYS.21,536-538(1953) A (K+2)ND ORDER FORMULA FOR ASYMMETRY DOUBLETS IN ROTATIONAL SPECTRA

21. C.VAN WINTER,PHYSICA 20,274-292(1954) THE ASYMMETRIC ROTATOR IN QUANTUM MECHANICS

22. G.ERLANDSSON,ARKIV FYSIK 10,65-88(1956) EXTENDED ENERGY LEVEL TABLES FOR THE RIGID ASYMMETRIC ROTOR

23. D.W.POSENER,J.CHEM.PHYS.24,546-547(1956) ASYMMETRIC ROTOR. CONVERGENCE IN THE CONTINUED FRACTION EXPANSION OF THE REDUCED ENERGIES

24. W.GIVENS,J.ASSOC.COMP.MACH.4,298-307(1957) THE CHARACTERISTIC VALUE-VECTOR PROBLEM

25. S.R.POLO,CAN.J.PHYS.35,880-885(1957) ENERGY LEVELS OF SLIGHTLY ASYMMETRIC TOP MOLECULES

26. R.H.SCHWENDEMAN,J.CHEM.PHYS.27,986(1957) TABLE OF COEFFICIENTS FOR THE ENERGY LEVELS OF A NEAR SYMMETRIC TOP

27. R.H.SCHWENDEMAN,A TABLE OF COEFFICIENTS FOR THE ENERGY LEVELS OF A NEAR SYMMETRIC TOP,DEPARTMENT OF CHEMISTRY,HARVARD UNIVERSITY(1957)

28. W.H.SHAFFER,J.MOL.SPECTRY 1,69-80(1957) OPERATIONAL DERIVATION OF WAVE FUNCTIONS FOR A SYMMETRICAL RIGID ROTATOR

29. D.G.BURKHARD,J.MOL.SPECTRY 2,187-202(1958) FACTORIZATION AND WAVE FUNCTIONS FOR THE SYMMETRIC RIGID ROTATOR

30. E.K.GORA,J.MOL.SPECTRY 2,259-272(1958) SIMPLIFIED METHODS FOR THE COMPUTATION OF ASYMMETRIC ROTOR ENERGY LEVELS AND LINE STRENGTHS

31. F.KNEUBUHL,T.GAUMANN,T.GINSBURG,AND HS.H.GUNTHARD,HELV.PHYS.ACTA 31, 276-277(1958) CALCULATION PROGRAM FOR EVALUATION OF THE ROTATIONAL SPECTRUM OF RIGID MOLECULES

32. R.H.SCHWENDEMAN AND V.W.LAURIE,TABLES OF LINE STRENGTHS,PERGAMON PRESS,NEW YORK(1958)

33. L.C.BROWN AND P.M.PARKER,TABLES OF ASYMMETRY PARAMETER FUNCTION, DEPARTMENTAL PUBLICATION,OHIO STATE UNIVERSITY(1959)

34. C.T.FIKE,J.CHEM.PHYS.31,568-569(1959) ENERGY LEVELS OF AN ASYMMETRIC ROTOR

35. F.KNEUBUHL,T.GAUMANN,AND HS.H.GUNTHARD,J.MOL.SPECTRY.3,349-362(1959) A PROGRAM FOR AUTOMATIC DIGITAL COMPUTATION OF TRANSITION FREQUENCIES AND ANALYSIS OF MICROWAVE ROTATIONAL SPECTRA OF RIGID ASYMMETRIC TOPS

52. M.SIDRAN,F.NOLAN,AND J.W.BLAKER,GRUMMAN RESEARCH DEPT.REPORT RE-189, OCTOBER(1964) ROTATIONAL ENERGY LEVELS OF ASYMMETRIC TOP MOLECULES, TABLE OF REDUCED ENERGIES(PART VI- FOR J=17 TO 18)

53. M.SIDRAN,F.NOLAN, AND J.W.BLAKER,GRUMMAN RESEARCH DEPT.REPORT RE-196, DECEMBER(1964) ROTATIONAL ENERGY LEVELS OF ASYMMETRIC TOP MOLECULES, TABLE OF REDUCED ENERGIES(PART VII-FOR J=19 TO 20)

54. J.D.LOUCK,J.MOL.SPECTRY 15,83-99(1965) EIGENVECTORS OF A SLIGHTLY ASYMMETRIC ROTATOR

Section V(a). GENERAL VIBRATION-ROTATION INTERACTION

1. J.L.DUNHAM,PHYS.REV.41,721-731(1932) THE ENERGY LEVELS OF A ROTATING VIBRATOR

2. D.M.DENNISON AND M.JOHNSTON,PHYS.REV.47,93-94(1935). THE INTERACTION BETWEEN VIBRATION AND ROTATION FOR SYMMETRICAL MOLECULES

3. M.JOHNSON AND D.M.DENNISON,PHYS.REV.48,868-883(1935) THE INTERACTION BETWEEN VIBRATION AND ROTATION FOR SYMMETRICAL MOLECULES

4. E.B.WILSON,JR.,J.CHEM.PHYS.4,313-316(1936) THE VIBRATION-ROTATION ENERGY LEVELS OF POLYATOMIC MOLECULES.II.PERTURBATIONS DUE TO NEARBY VIBRATIONAL STATES

5. E.B.WILSON,JR, AND J.B.HOWARD,J.CHEM.PHYS.4,260-268(1936) THE VIBRATION-ROTATION ENERGY LEVELS OF POLYATOMIC MOLECULES.I. MATHEMATICAL THEORY OF SEMI-RIGID ASYMMETRIC TOP MOLECULES

6. H.H.NIELSEN,PHYS.REV.60,794-810(1941) THE VIBRATION-ROTATION ENERGIES OF POLYATOMIC MOLECULES

7. W.H.SHAFFER,J.CHEM.PHYS.10,1-9(1942) INFRA-RED SPECTRA OF AXIALLY SYMMETRIC XY3Z MOLECULES. I.VIBRATION-ROTATION ENERGIES

8. S.SILVER,J.CHEM.PHYS.10,565-574(1942) VIBRATION-ROTATION ENERGIES OF PLANAR ZXY2 MOLECULES. PART II. THE QUANTUM-MECHANICAL HAMILTONIAN AND THE ENERGY VALUES

9. S.SILVER AND E.S.EBERS,J.CHEM.PHYS.10,559-564(1942) VIBRATION-ROTATION ENERGIES OF PLANAR ZXY2 MOLECULES. PART I. THE VIBRATIONAL MODES AND FREQUENCIES

10. A.H.NIELSEN,J.CHEM.PHYS.11,160-163(1943) THE VIBRATION-ROTATION ENERGIES OF THE LINEAR XYZ TYPE MOLECULE

11. H.H.NIELSEN,PHYS.REV.66,282-287(1944) THE QUANTUM MECHANICAL HAMILTONIAN FOR THE LINEAR POLYATOMIC MOLECULE TREATED AS A LIMITING CASE OF THE NON-LINEAR POLYATOMIC MOLECULE

12. H.H.NIELSEN,J.OPT.SOC.AMER.34,521-528(1944) THE ENERGIES OF POLYATOMIC MOLECULES

13. W.H.SHAFFER AND R.P.SCHUMAN,J.CHEM.PHYS.12,504-513(1944) THE INFRA-RED SPECTRA OF BENT XYZ MOLECULES. PART I. VIBRATION-ROTATION ENERGIES

14. H.H.NIELSEN,PHYS.REV.68,181-191(1945) THE VIBRATION-ROTATION ENERGIES OF POLYATOMIC MOLECULES. PART II. ACCIDENTAL DEGENERACIES

15. W.H.SHAFFER AND R.C.HERMAN,J.CHEM.PHYS.13,83-88(1945) THE TETRAHEDRAL X2YZ2 MOLECULAR MODEL . PART II. ROTATION-VIBRATION ENERGIES

16. R.C.HERMAN AND W.H.SHAFFER,J.CHEM.PHYS. 16,453-465(1948) THE CALCULATION OF PERTURBATION ENERGIES IN VIBRATING ROTATING POLYATOMIC MOLECULES

17. H.H.NIELSEN,PHYS.REV.75,1961(1949) ANOMALIES IN THE MICROWAVE

SPECTRUM OF METHYL CYANIDE AND METHYL ISOCYANIDE

18. R.C.HERMAN AND W.H.SHAFFER,J.CHEM.PHYS.18,1207-1211(1950) THE VIBRATION-ROTATION ENERGIES OF THE PLANE SYMMETRICAL X2Y2X2 MOLECULAR MODEL

19. W.LOW AND C.H.TOWNES,PHYS.REV.79,224 (1950) EFFECT OF FERMI RESONANCE ON ROTATION-VIBRATION INTERACTION IN OCS AND OCSE

20. H.H.NIELSEN,PHYSICA 17,432-439(1951) ANOMALIES IN THE MICROWAVE SPECTRA OF SYMMETRIC MOLECULES

21. H.H.NIELSEN,REV.MOD.PHYS.23,90-136(1951) THE VIBRATION-ROTATION ENERGIES OF MOLECULES

22. S.M.FERIGLE AND A.WEBER,AM.J.PHYS.21,102-107(1953) THE ECKART CONDITIONS FOR A POLYATOMIC MOLECULE

23. W.LOW,PHYS.REV.97,1664-1667(1955) FERMI RESONANCE IN THE MICROWAVE SPECTRUM OF LINEAR XYZ MOLECULES

24. G.AMAT,M.GOLDSMITH,AND H.H.NIELSEN,J.CHEM.PHYS.27,838-844(1957) HIGHER ORDER ROTATION-VIBRATION ENERGIES OF POLYATOMIC MOLECULES.II.

25. G.AMAT AND H.H.NIELSEN,COMPT.REND. 244,2302-2304(1957) INFLUENCE OF ROTATIONAL DISTORTIONS ON THE VIBRATION-ROTATION SPECTRUM OF LINEAR MOLECULES

26. G.AMAT AND H.H.NIELSEN,J.CHEM.PHYS.27,845-850(1957) HIGHER ORDER ROTATION-VIBRATION ENERGIES OF POLYATOMIC MOLECULES. III.

27. P.R.SWAN,JR. AND M.W.P.STRANDBERG,J.MOL.SPECTRY.1,333-378(1957) VIBRATION-INTERNAL ROTATION INTERACTIONS IN MOLECULES CONTAINING A SYMMETRIC TOP GROUP

28. G.AMAT AND L.HENRY,J.PHYS.RADIUM 21,728-730(1960) RESONANCES AND K-TYPE DOUBLING IN MOLECULES HAVING AXIAL SYMMETRY

29. T.OKA AND Y.MORINO,J.PHYS.SOC.JAPAN 16,1235-1242(1961) MICROWAVE SPECTRUM OF FORMALDEHYDE III. VIBRATION-ROTATION INTERACTION

30. M.L.GRENIER-BESSON AND G.AMAT,J.MOL.SPECTRY 8,22-29(1962) ROTATIONAL SPECTRUM OF MOLECULES WITH C3V SYMMETRY IN AN EXCITED VIBRATIONAL STATE,VT=1.

31. M.L.GRENIER-BESSON,G.AMAT,AND H.H.NIELSEN,J.CHEM.PHYS.36,3454-3459 (1962) HIGHER-ORDER ROTATION-VIBRATION ENERGIES OF POLYATOMIC MOLECULES VI

32. D.R.HERSCHBACH AND V.W.LAURIE,J.CHEM.PHYS.37,1668-1686(1962) INFLUENCE OF VIBRATIONS ON MOLECULAR STRUCTURE DETERMINATIONS. I. GENERAL FORMULATION OF VIBRATION-ROTATION INTERACTIONS.

33. S.MAES,J.MOL.SPECTRY 9,204-215(1962) SOME THIRD ORDER CORRECTIONS TO THE ROTATION-VIBRATION ENERGIES OF POLYATOMIC MOLECULES

34. K.T.CHUNG AND P.M.PARKER,J.CHEM.PHYS.38,8-17(1963) ASYMMETRIC-TOP VIBRATION-ROTATION HAMILTONIANS ERRATA-J.CHEM.PHYS.39,240(1963)

35. N.JACOBI AND J.H.JAFFE,J.MOL.SPECTRY.10,1-11(1963) INFLUENCE OF VIBRATION-ROTATION INTERACTION ON SPECTRAL LINE INTENSITIES OF LINEAR MOLECULES

36. F.DORMAN AND C.C.LIN,J.MOL.SPECTRY.12,119-128(1964) DETERMINATION OF THE CUBIC ANHARMONIC POTENTIAL CONSTANTS FROM THE VIBRATION-ROTATION INTERACTION CONSTANTS OF THE OCS AND N2O MOLECULES

37. J.W.C.JOHNS,J.MOL.SPECTRY 15,473-482(1965) K-TYPE DOULBING OF LINEAR MOLECULES IN $^1\Pi$ ELECTRONIC STATES

Section V(b). CENTRIFUGAL DISTORTION

38. E.L.HILL AND J.H.VAN VLECK, PHYS.REV. 32,250-272(1928) ON THE QUANTUM MECHANICS OF THE ROTATIONAL DISTORTION OF MULTIPLETS IN MOLECULAR SPECTRA

39. E.B.WILSON,JR.,J.CHEM.PHYS.4,526-529(1936) THE EFFECT OF ROTATIONAL DISTORTION ON THE THERMODYNAMIC PROPERTIES OF WATER AND OTHER POLYATOMIC MOLECULES

40. E.B.WILSON,JR.,J.CHEM.PHYS.5,617-620(1937) THE VIBRATION-ROTATION ENERGY LEVELS OF POLYATOMIC MOLECULES.III.EFFECT OF CENTRIFUGAL DISTORTION

41. Z.I.SLAWSKY AND D.M.DENNISON,J.CHEM.PHYS.7,509-521(1939) THE CENTRIFUGAL DISTORTION OF AXIAL MOLECULES

42. S.GOLDEN,J.CHEM.PHYS.16,250-253(1948) AN ASYMPTOTIC EXPRESSION FOR THE ENERGY LEVELS OF THE ASYMMETRIC ROTOR. II.CENTRIFUGAL DISTORTION CORRECTION ERRATA-J.CHEM.PHYS.17,586(1948)

43. W.S.BENEDICT,PHYS.REV.75,1317 (1949) CENTRIFUGAL STRETCHING IN H2O AND D2O

44. H.H.NIELSEN,PHYS.REV.78,415-416(1950) A NOTE ON THE CENTRIFUGAL STRETCHING IN AXIALLY SYMMETRIC MOLECULES

45. J.W.SIMMONS AND W.E.ANDERSON,PHYS.REV.80,338-342(1950) MICROWAVE DETERMINATION OF THE CENTRIFUGAL DISTORTION CONSTANTS OF CH3CL, CH3BR,CH3I,BRCN,AND ICN.

46. R.E.HILLGER AND M.W.P.STRANDBERG,PHYS.REV.83,575-581(1951) CENTRIFUGAL DISTORTION IN ASYMMETRIC MOLECULES. II. HDS

47. R.B.LAWRENCE AND M.W.P.STRANDBERG,PHYS.REV.83,363-369(1951) CENTRIFUGAL DISTORTION IN ASYMMETRIC TOP MOLECULES. I. ORDINARY FORMALDEHYDE,H2C(12)O

48. D.KIVELSON AND E.B.WILSON,JR.,J.CHEM.PHYS.20,1575-1579(1952) APPROXIMATE TREATMENT OF THE EFFECT OF CENTRIFUGAL DISTORTION ON THE ROTATIONAL ENERGY LEVELS OF ASYMMETRIC-ROTOR MOLECULES

49. M.W.P.STRANDBERG,ANN.N.Y.ACAD.SCI.55,808-813(1952) CENTRIFUGAL DISTORTION

50. F.D.REDARD,J.J.GALLAGHER, AND C.M.JOHNSON,PHYS.REV.92,1440(1953) MICROWAVE MEASUREMENT OF DO FOR CO

51. T.S.CHANG AND D.M.DENNISON,J.CHEM.PHYS.21,1293(1953) CENTRIFUGAL DISTORTION EFFECTS IN METHYL CHLORIDE

52. D.KIVELSON AND E.B.WILSON,JR.,J.CHEM.PHYS.21,1229-1236(1953) THEORY OF CENTRIFUGAL DISTORTION CONSTANTS OF POLYATOMIC ROTOR MOLECULES

53. J.COX,W.J.O.THOMAS,AND W.GORDY,PHYS.REV.95,299 (1954) CENTRIFUGAL DISTORTION IN THE METHYL HALIDES

54. D.KIVELSON,J.CHEM.PHYS.22,904-908(1954) THE DETERMINATION OF THE POTENTIAL CONSTANTS OF SO2 FROM CENTRIFUGAL DISTORTION EFFECTS

55. D.W.POSENER AND M.W.P.STRANDBERG,PHYS.REV.95,374-384(1954) CENTRIFUGAL DISTORTION IN ASYMMETRIC TOP MOLECULES. III. H2O,D2O,AND HDO

56. W.J.O.THOMAS,J.T.COX,AND W.GORDY,J.CHEM.PHYS.22,1718-1722(1954) MILLIMETER WAVE SPECTRA AND CENTRIFUGAL STRETCHING CONSTANTS OF THE METHYLHALIDES

57. G.AMAT,M.GOLDSMITH,AND H.H.NIELSEN,J.CHEM.PHYS.24,44-47(1956) INFLUENCE OF FERMI RESONANCE ON THE CENTRIFUGAL STRETCHING CONSTANT OF A LINEAR MOLECULE

58. L.PIERCE,J.CHEM.PHYS.24,139-142(1956) DETERMINATION OF THE POTENTIAL CONSTANTS OF OZONE FROM CENTRIFUGAL DISTORTION EFFECTS

59. J.M.DOWLING,R.GOLD,AND A.G.MEISTER,J.MOL.SPECT.1,265-269(1957) CALCULATION OF ROTATIONAL DISTORTION CONSTANTS FOR SOME AXIALLY SYMMETRIC ZX3Y MOLECULES

60. H.H.NIELSEN ,G.AMAT,AND M.GOLDSMITH,J.CHEM.PHYS.26,1060-1066(1957) ANOMALOUS CENTRIFUGAL DISTORTION COEFFICIENTS IN LINEAR POLYATOMIC MOLECULES

61. E.B.WILSON,JR.,J.CHEM.PHYS.27,986-987(1957) CENTRIFUGAL DISTORTION IN SYMMETRIC ROTOR MOLECULES

62. J.M.DOWLING,R.GOLD,AND A.G.MEISTER,J.MOL.SPECTRY.2,411-412(1958) A NOTE ON THE CALCULATION OF ROTATIONAL DISTORTION CONSTANTS FOR AXIALLY SYMMETRIC ZX3Y MOLECULES

63. G.ERLANDSSON,ARKIV FYSIK 16,181-184(1959) COMPUTER PROGRAM FOR CENTRIFUGAL DISTORTION IN ASYMMETRIC TOP ROTATIONAL SPECTRA

64. P.M.PARKER AND L.C.BROWN,J.CHEM.PHYS.31,1227-1230(1959) COMPUTATION OF ASYMMETRIC ROTATOR CONSTANTS FROM ENERGY MOMENTS. III. FIRST-ORDER CENTRIFUGAL STRETCHING EFFECTS

65. P.FAVERO,A.M.MIRRI,AND S.G.BAKER,NUOVO CIMENTO 17,740-748(1960) CENTRIFUGAL EFFECTS IN MILLIMETER WAVE SPECTRA-FORMYL FLUORIDE

66. M.W.LONG,J.CHEM.PHYS.32,948(1960) CENTRIFUGAL DISTORTION IN SYMMETRIC TOP MOLECULES

67. J.M.DOWLING,J.MOL.SPECTRY 6,550-553(1961) CENTRIFUGAL DISTORTION IN PLANAR MOLECULES

68. H.C.ALLEN,JR. AND W.B.OLSEN,J.CHEM.PHYS.37,212-214(1962) SUM RULES FOR VIBRATIONAL-ROTATIONAL ENERGY LEVELS INCLUDING CENTRIFUGAL DISTORTION

69. R.A.HILL AND T.H.EDWARDS,J.MOL.SPECTRY 9,494-497(1962) FIRST-ORDER CENTRIFUGAL DISTORTION IN PLANAR ASYMMETRIC MOLECULES

70. R.C.JOHNSON,Q.WILLIAMS,AND T.L.WEATHERLY,J.CHEM.PHYS.36,1588-1590 (1962) CENTRIFUGAL STRETCHING OF CCLF3 AND SOME OTHER SYMMETRIC TOPS

71. P.M.PARKER,J.CHEM.PHYS.37,1596-1599(1962) SYMMETRY PROPERTIES OF THE ASYMMETRIC-ROTATOR CENTRIFUGAL DISTORTION CONSTANTS

72. M.G.K.PILLAI AND R.F.CURL,JR.,J.CHEM.PHYS.37,2921-2926(1962) MICROWAVE SPECTRUM OF CHLORINE DIOXIDE IV. DETERMINATION OF CENTRIFUGAL DISTORTION EFFECTS AND POTENTIAL CONSTANTS

73. H.D.RUDOLPH,Z.NATURFORSCH. 17A,288-297(1962) THE CENTRIFUGAL CORRECTION IN ROTATIONAL SPECTRA OF MOLECULES WITH INTERNAL ROTATION SUCH AS (CH3)2S

74. P.G.FAVERO AND A.M.MIRRI,NUOVO CIMENTO 30,502-506(1963) MILLIMETER WAVE SPECTRA AND CENTRIFUGAL DISTORTION CONSTANTS OF CHCL3 AND CFCL3

75. R.A.HILL AND T.H.EDWARDS,J.MOL.SPECTRY.11,433-439(1963) SUM RULES FOR PLANAR ASYMMETRIC MOLECULES

76. L.PIERCE,N.DICIANNI,AND R.H.JACKSON,J.CHEM.PHYS.38,730-739(1963) CENTRIFUGAL DISTORTION EFFECTS IN ASYMMETRIC ROTOR MOLECULES I. QUADRATIC POTENTIAL CONSTANTS AND AVERAGE STRUCTURE OF OXYGEN DIFLUORIDE FROM THE GROUND STATE ROTATIONAL SPECTRUM

77. A.BAUER,J.BELLET,P.POUZET,AND A.REMY,COMPT.REND.259,761-764(1964) DETERMINATION OF THE ROTATIONAL AND CENTRIFUGAL DISTORTION CONSTANTS OF S(32)O2 IN THE V2 EXCITED STATE

78. M.WINNEWISSER AND R.L.COOK,J.CHEM.PHYS.41,999-1004(1964) CENTRIFUGAL DISTORTION EFFECTS AND STRUCTURE OF HYDRAZOIC ACID FROM THE MILLIMETER WAVE ROTATIONAL SPECTRA

Section V(c). CORIOLIS COUPLING

79. H.A.JAHN,PROC.ROY.SOC.LONDON 168A,469-518(1938) NEW CORIOLIS PERTURBATION IN THE METHANE SPECTRUM. PART I. VIBRATIONAL-ROTATIONAL HAMILTONIAN AND WAVE FUNCTIONS. PART II. ENERGY LEVELS

80. H.A.JAHN,PHYS.REV.56,680-683(1939) NOTE ON CORIOLIS COUPLING TERMS IN POLYATOMIC MOLECULES

81. H.H.NIELSEN,PHYS.REV.70,184-186(1946) A NOTE CONCERNING THE CORIOLIS CONTRIBUTION TO THE ENERGY OF A SYMMETRIC POLYATOMIC MOLECULE

82. D.R.J.BOYD AND H.C.LONGUET-HIGGINS,PROC.ROY.SOC.,LONDON A213,55-73 (1952) CORIOLIS INTERACTION BETWEEN VIBRATION AND ROTATION IN SYMMETRIC TOP MOLECULES

83. R.C.LORD AND R.E.MERRIFIELD,J.CHEM.PHYS.20,1348-1350(1952) EVALUATION OF THE ZETA SUMS FOR ROTATION-VIBRATION INTERACTION IN AXIALLY SYMMETRICAL MOLECULES

84. J.H.MEAL AND S.R.POLO,J.CHEM.PHYS.24,1119-1125(1956) VIBRATION-ROTATION INTERACTION IN POLYATOMIC MOLECULES. I.THE ZETA MATRICES

85. J.H.MEAL AND S.R.POLO,J.CHEM.PHYS.24,1126-1133(1956) VIBRATION-ROTATION INTERACTION IN POLYATOMIC MOLECULES. II. THE DETERMINATION OF CORIOLIS COUPLING COEFFICIENTS

86. V.W.LAURIE AND D.T.PENCE,J.MOL.SPECTRY.10,155-160(1963) MICROWAVE SPECTRUM OF F2CO-EXCITED VIBRATIONAL STATES AND CORIOLIS COUPLING

Section V(d). L-TYPE DOUBLING

87. G.HERZBERG,REVS.MOD.PHYS.14,219-223(1942) L-TYPE DOUBLING IN LINEAR POLYATOMIC MOLECULES

88. H.H.NIELSEN AND W.H.SHAFFER,J.CHEM.PHYS.11,140-144(1943) A NOTE CONCERNING L-TYPE DOUBLING IN LINEAR POLYATOMIC MOLECULES ERRATA- PHYS.REV.75,1961(1949)

89. H.H.NIELSEN,PHYS.REV.77,130-135(1950) L-TYPE DOUBLING IN POLYATOMIC MOLECULES AND ITS APPLICATION TO THE MICROWAVE SPECTRUM OF METHYL CYANIDE AND METHYL ISOCYANIDE

90. H.H.NIELSEN,PHYS.REV.78,296(1950) L-TYPE DOUBLING IN OCS AND HCN

91. R.G.SHULMAN AND C.H.TOWNES,PHYS.REV.77,421-422(1950) NEW TYPES OF MICROWAVE TRANSITIONS INVOLVING L-TYPE DOUBLING IN OCS AND HCN

92. J.DE HEER,PHYS.REV.83,741-745(1951) A NOTE CONCERNING L-TYPE DOUBLING IN AXIALLY SYMMETRIC MOLECULES, IN PARTICULAR WITH REFERENCE TO MOLECULES BELONGING TO THE SYMMETRY GROUPS C4V AND VD

93. J.DE HEER AND H.H.NIELSEN,J.CHEM.PHYS.20,101-104(1952) L-TYPE DOUBLING IN ENERGY LEVELS OF CARBON DIOXIDE COUPLED BY FERMI RESONANCE

94. T.L.WEATHERLY AND D.WILLIAMS,PHYS.REV.87,517-518(1952) L-TYPE DOUBLING TRANSITIONS IN HCN AND DCN

95. R.J.COLLIER,PHYS.REV.95,1200-1202(1954) DIRECT L-DOUBLET TRANSITION OF HCN IN THE 10-CENTIMETER WAVELENGTH REGION

96. J.F.WESTERKAMP,PHYS.REV.93,716(1954) VARIATION OF THE L-TYPE DOUBLING CONSTANT IN HCN

97. A.MIYAHARA,H.HIRAKAWA,AND K.SHIMODA,J.PHYS.SOC.JAPAN 11,335(1956)

L-TYPE DOUBLING SPECTRA OF HCN AND DCN IN THE SUPERHIGH FREQUENCY REGION

98. G.AMAT,M.L.GRENIER-BESSON,AND H.Z.CUMMINS,COMPT.REND.244,2380-2381 (1957) SIGN OF THE CONSTANT Q OF L-TYPE DOUBLING

99. L.YARMUS,PHYS.REV.105,928-929(1957) DIRECT L-TYPE DOUBLING TRANSITIONS IN ClCN

100. G.AMAT AND H.H.NIELSEN,J.MOL.SPECTRY 2,152-162(1958) VIBRATIONAL L-TYPE DOUBLING AND L-TYPE RESONANCE IN LINEAR POLYATOMIC MOLECULES

101. G.AMAT AND H.H.NIELSEN,J.MOL.SPECTRY 2,163-172(1958) ROTATIONAL DISTORTION IN LINEAR MOLECULES ARISING FROM L-TYPE RESONANCE

102. T.S.JASEJA,PROC.INDIAN ACAD.SCI.504,108-128(1959) THE MICROWAVE SPECTRUM OF METHYL CYANIDE AND L-TYPE DOUBLING IN CH3CN,CH3NC,CH3CCH, AND CF3CCH

103. M.L.GRENIER-BESSON,J.PHYS.RADIUM 21,555-565(1960) ROTATIONAL L-TYPE DOUBLING AND RESONANCE IN MOLECULES HAVING AXIAL SYMMETRY

104. T.TORRING,Z.PHYSIK 161,179-189(1961) L-TYPE DOUBLETS OF THE ISOTOPIC HCN MOLECULES

105. P.VENKATESWARLU,J.G.BAKER,AND W.GORDY,J.MOL.SPECTRY.6,215-228(1961) THE MILLIMETER WAVE SPECTRUM OF METHYL CYANIDE AND THE L-TYPE DOUBLING

106. G.G.WEBER,J.MOL.SPECTRY.10,321-347(1963) ON THE L-TYPE DOUBLING AND L-TYPE RESONANCE OF MOLECULES IN THE MICROWAVE REGION

Section VI. MOLECULAR STRUCTURE

Most microwave structure determinations have been carried out using the general isotopic substitution formulas in terms of the equilibrium moments of inertia developed by Kraitchman.[7] The r_s and r_o structures have been compared and discussed[14] regarding the equilibrium structure, and a double substitution technique has been devised to treat small coordinate.[20,22] The effects of molecular vibrations on the molecular structure[32] and, in particular, on the inertia defect[27,34,37,39,42] determined from microwave data have received considerable attention.

1. W.GORDY,J.CHEM.PHYS.15,305-310(1947) DEPENDENCE OF BOND ORDER AND OF BOND ENERGY UPON BOND LENGTH

2. W.GORDY,J.CHEM.PHYS.15,81-84(1947) A RE-EVALUATION OF THE COVALENT RADII OF SOME OF THE ELEMENTS

3. R.FREYMANN,ONDE ELECT.30,416-424(1950) CENTIMETER WAVES AND MOLECULAR STRUCTURE

4. E.B.WILSON,JR.,DIS. FARADAY SOC.9,108-114(1950) DETERMINATION OF MOLECULAR STRUCTURE WITH MICROWAVE SPECTROSCOPY

5. J.N.SHOOLERY,R.G.SHULMAN,W.F.SHEEHAN,JR.,V.SCHOMAKER, AND D.M.YOST J.CHEM.PHYS.19,1364-1369(1951) THE STRUCTURE OF TRIFLUOROMETHYL ACETYLENE FROM THE MICROWAVE SPECTRUM AND ELECTRON DIFFRACTION PATTERN

6. D.KIVELSON AND E.B.WILSON,JR.,J.CHEM.PHYS.21,1236(1953) AN AID IN THE DETERMINATION OF INTERNAL PARAMETERS FROM ROTATIONAL CONSTANTS FOR POLYATOMIC MOLECULES

7. J.KRAITCHMAN,AM.J.PHYS.21,17-24(1953) DETERMINATION OF MOLECULAR STRUCTURE FROM MICROWAVE SPECTROSCOPIC DATA

8. L.M.SVERDLOV,DOKLADY AKAD.NAUK SSSR.88,249-252(1953) RELATIONS BETWEEN MOMENTS OF INERTIA AND ROTATION FREQUENCIES OF ISOTOPIC MOLECULES

9. W.D.GWINN,DIS.FARADAY SOC.19,43-51(1955) INFORMATION PERTAINING TO MOLECULAR STRUCTURE AS OBTAINED FROM THE MICROWAVE SPECTRA OF MOLECULES OF THE ASYMMETRIC ROTOR TYPE

10. A.ALMENNINGEN AND O.BASTIANSEN,RES.CORRES.,SUPPL.TO RESEARCH(LONDON) 9,35-36(1956) ACCURACY OF THE ELECTRON DIFF[illegible]CTION METHOD FOR THE DETERMINATION OF STRUCTURAL PARAMETERS IN THE GASEOUS STATE

11. T.E.TURNER AND J.A.HOWE,J.CHEM.PHYS.24,924-925(1956) DETERMINATION OF MOLECULAR STRUCTURES FROM ROTATIONAL SPECTRA MEASUREMENTS

12. L.F.THOMAS,J.S.HEEKS,AND J.SHERIDAN,ARCH.ACI.(GENEVA)10,180-183 (1957) STUDIES OF CONJUGATION AND HYPERCONJUGATION IN SEVERAL MOLECULES BY MICROWAVE SPECTROSCOPY

13. W.ZEIL AND J.F.PEROMMER,Z.ELEKTROCHEM.61,938-940(1957) MICROWAVE SPECTROSCOPIC MEASUREMENTS CONCERNING THE KNOWLEDGE OF THE C-C DISTANCE IN THE C-CN GROUP OF NITRILES

14. C.C.COSTAIN,J.CHEM.PHYS.29,864-874(1958) DETERMINATION OF MOLECULAR STRUCTURES FROM GROUND STATE ROTATIONAL CONSTANTS

15. V.W.LAURIE,J.CHEM.PHYS.28,704-706(1958) NOTE ON THE DETERMINATION OF MOLECULAR STRUCTURE FROM SPECTROSCOPIC DATA

16. D.R.LIDE,JR. AND D.E.MANN,AM.CHEM.SOC.DIV.PETROL CHEM.PREPRINTS 3, 49-50(1958) MOLECULAR STRUCTURE STUDIES OF HYDROCARBONS BY MICROWAVE SPECTROSCOPY

17. C.C.COSTAIN AND B.P.STOICHEFF,J.CHEM.PHYS.30,777-782(1959) MICROWAVE SPECTRUM,MOLECULAR STRUCTURE OF VINYL CYANIDE,AND A SUMMARY OF CARBON-CARBON,CARBON-HYDROGEN BOND LENGTHS IN SIMPLE MOLECULES

18. V.W.LAURIE,J.CHEM.PHYS.30,1101-1102(1959) COMMENTS ON THE STRUCTURE OF 1,1,1-TRIFLUORO-2-BUTYNE

19. T.NISHIKAWA,KAGAKU NO.RYOIKI 13,385-395(1959) STUDIES OF MOLECULAR STRUCTURE BY MICROWAVE METHOD

20. L.PIERCE,J.MOL.SPECTRY.3,575-580(1959) NOTE ON THE USE OF GROUND-STATE ROTATIONAL CONSTANTS IN THE DETERMINATION OF MOLECULAR STRUCTURE

21. P.H.VERDIER AND E.B.WILSON,JR.,J.CHEM.PHYS.30,1372-1373(1959) FORCE CONSTANT CALCULATIONS IN LINEAR TRIATOMIC MOLECULES FROM INFRARED AND MICROWAVE DATA

22. L.C.KRISHER AND L.PIERCE,J.CHEM.PHYS.32,1619-1625(1960) SECOND DIFFERENCES OF MOMENTS OF INERTIA IN STRUCTURAL CALCULATIONS-APPLICATION TO METHYL-FLUOROSILANE MOLECULES

23. J.K.BROWN AND A.P.COX,SPECTROCHIM.ACTA 17,1230-1239(1961) NEAR-EQUILIBRIUM BOND DISTANCES IN SIMPLE MOLECULES

24. D.R.HERSCHBACH AND V.W.LAURIE,J.CHEM.PHYS.35,458-463(1961) ANHARMONIC POTENTIAL CONSTANTS AND THEIR DEPENDENCE UPON BOND LENGTH

25. D.R.LIDE,JR. AND D.CHRISTENSEN,J.CHEM.PHYS.35,1374-1378(1961) MOLECULAR STRUCTURE OF PROPYLENE

26. D.R.LIDE,JR. AND D.CHRISTENSEN,SPECTROCHIM.ACTA 17,665-668(1961) AN IMPROVED STRUCTURE DETERMINATION FOR VINYL FLUORIDE

27. T.OKA AND Y.MORINO,J.MOL.SPECTRY.6,472-482(1961) CALCULATION OF INERTIA DEFECT PART I. GENERAL FORMULATION

28. B.BAK,D.CHRISTENSEN,W.B.DIXON,L.HANSEN-NYGAARD,AND J.RASTRUP-ANDERSEN,J.CHEM.PHYS.37,2027-2031(1962) BENZENE RING DISTORTION BY ONE SUBSTITUTENT . MICROWAVE DETERMINATION OF THE COMPLETE STRUCTURE OF BENZONITRILE

29. B.BAK,D.CHRISTENSEN,W.B.DIXON,L.HANSEN-NYGAARD,J.RASTRUP-ANDERSEN AND M.SCHOTTLANDER,J.MOL.SPECTRY.9,124-129(1962) THE COMPLETE STRUCTURE OF FURAN

30. B.BAK,D.CHRISTENSEN,L.HANSEN-NYGAARD,AND J.RASTRUP-ANDERSEN, SPECTROCHIM.ACTA 18,229-233(1962) ANALYSIS OF THE MICROWAVE SPECTRUM OF 2-FLUORO-NAPHTHALENE WITH A DISCUSSION OF STRUCTURE DETERMINATION POSSIBILITIES

31. M.JEN AND D.R.LIDE,JR.,J.CHEM.PHYS.36,2525-2526(1962) MOLECULAR STRUCTURE OF CHLOROFORM

32. V.W.LAURIE AND D.R.HERSCHBACH,J.CHEM.PHYS.37,1687-1692(1962) INFLUENCE OF VIBRATIONS ON MOLECULAR STRUCTURE DETERMINATIONS.II. AVERAGE STRUCTURES DERIVED FROM SPECTROSCOPIC DATA

33. Y.MORINO,K.KUCHITSU,AND T.OKA,J.CHEM.PHYS.36,1108-1109(1962) INTERNUCLEAR DISTANCE PARAMETERS

34. T.OKA AND Y.MORINO,J.MOL.SPECTRY.8,9-21(1962) CALCULATION OF INERTIA DEFECT PART II. NONLINEAR SYMMETRIC XY2MOLECULES

35. L.S.BARTELL,J.CHEM.PHYS.38,1827-1833(1963) CALCULATION OF MEAN ATOMIC POSITIONS IN VIBRATING POLYATOMIC MOLECULES

36. U.BLUKIS,P.H.KASAI,AND R.J.MYERS,J.CHEM.PHYS.38,2753-2760(1963) MICROWAVE SPECTRA AND STRUCTURE OF DIMETHYL ETHER

37. D.R.HERSCHBACH AND V.W.LAURIE,UCRL-11208(1963) INFLUENCE OF VIBRATIONS ON MOLECULAR STRUCTURE DETERMINATIONS III. INERTIAL EFECTS DEFECTS

38. D.R.LIDE,JR.AND M.JEN,J.CHEM.PHYS.38,1504-1507(1963) MICROWAVE SPECTRUM OF TERTIARY BUTYL CHLORIDE. A COMPARISON OF TERTIARY BUTYL STRUCTURES

39. T.OKA AND Y.MORINO,J.MOL.SPECTRY.11,349-367(1963) INERTIA DEFECT PART III. INERTIA DEFECT AND PLANARITY OF FOUR-ATOMIC MOLECULES

40. A.CHUTJIAN,J.MOL.SPECTRY 14,361-370(1964) DETERMINATION OF STRUCTURE BY ISOTOPIC SUBSTITUTION IN MOLECULES WITH SYMMETRICALLY EQUIVALENT ATOMS

41. M.TOYAMA,T.OKA,AND Y.MORINO,J.MOL.SPECTRY.13,193-213(1964) EFFECT OF VIBRATION AND ROTATION ON THE INTERNUCLEAR DISTANCE

42. K.KUCHITSU,T.OKA,AND Y.MORINO,J.MOL.SPECTRY 15,51-67(1965) CALCULATION OF INERTIA DEFECT. PART IV. ETHYLENE-TYPE MOLECULES

Section VII. QUADRUPOLE COUPLING

Nuclear quadrupole interactions can perturb the rotational spectrum of a molecule which contains one or more nuclei with nonspherical nuclear charge distributions. These effects have been studied in linear, symmetric, and asymmetric top molecules[19, 21] to provide information concerning the electric field gradient at the quadrupole nucleus. Second-order effects can become prominent when the quadrupole interaction is sizable or when an appropriate near degeneracy is present.[100, 102, 103] In the case of an asymmetric rotor, the second-order interaction may lead to an evaluation of an off-diagonal coupling constant X_{ij}. Intensities of the hyperfine components have been adopted directly from atomic spectra.[2, 3] Bersohn[37] and Misushima and Ito[48] have treated the case of three quadrupole nuclei in a symmetric rotor. Work has also been done on asymmetric rotors with two quadrupole nuclei.[104-106, 109, 112] As experimental sensitivity is improved, coupling in excited vibrational states may be studied.[86, 88] Interactions with an external electric field are referenced in Section X.

Excellent reviews on the subject have been written by Das and Hahn[97] and O'Konski.[107]

1. E.L.HILL,PROC.NATL.ACAD.SCI.15,779-784(1929) RELATIVE INTENSITIES IN NUCLEAR SPIN MULTIPLETS

2. L.PAULING AND S.GOUDSMIT,THE STRUCTURE OF LINE SPECTRA,MCGRAW-HILL BOOK COMPANY,INC.,NEW YORK(1930)

3. H.E.WHITE,INTRODUCTION TO ATOMIC SPECTRA,MCGRAW-HILL BOOK COMPANY, INC.,NEW YORK(1934)

4. H.B.G.CASIMIR,ON THE INTERACTION BETWEEN ATOMIC NUCLEI AND ELECTRONS, TEYLERS TWEDE GENOOTSCHAP,E.F.BOHN,HAARLEM(1936)

5. J.M.B.KELLOGG,I.I.RABI,N.F.RAMSEY,AND H.R.ZACHARIAS PHYS.REV.57,677-695(1940) AN ELECTRICAL QUADRUPOLE MOMENT OF THE DEUTERON. THE RADIOFREQUENCY SPECTRA OF HD AND D2 MOLECULES IN A MAGNETIC FIELD

6. A.NORDSIECK,PHYS.REV.58,310-315(1940) ON THE VALUE OF THE ELECTRIC QUADRUPOLE MOMENT OF THE DEUTERON

7. G.RACAH,PHYS.REV.61,186-197(1942) THEORY OF COMPLEX SPECTRA.I.

8. G.RACAH,PHYS.REV.62,438-462(1942) THEORY OF COMPLEX SPECTRA.II.

9. G.RACAH,PHYS.REV.63,367-382(1943) THEORY OF COMPLEX SPECTRA.III.

10. B.T.FELD AND W.E.LAMB,JR.,PHYS.REV.67,15-33(1945) EFFECT OF NUCLEAR QUADRUPOLE MOMENT ON THE ENERGY LEVELS OF A DIATOMIC MOLECULE IN A MAGNETIC FIELD. PART I. HETERONUCLEAR MOLECULES

11. B.P.DAILEY,R.L.KYHL,M.W.P.STRANDBERG,J.H.VAN VLECK,AND E.B.WILSON,JR., PHYS.REV.70,984(1946) THE HYPERFINE STRUCTURE OF THE MICROWAVE SPECTRUM OF AMMONIA AND THE EXISTENCE OF A QUADRUPOLE MOMENT IN N(14)

12. B.T.FELD,PHYS.REV.72,1116-1117(1947) ON THE NUCLEAR ELECTRIC QUADRUPOLE INTERACTION IN MOLECULAR SPECTRA

13. H.M.FOLEY,PHYS.REV.71,747-751(1947) NOTE ON THE NUCLEAR ELECTRIC QUADRUPOLE SPECTRUM OF A HOMONUCLEAR DIATOMIC MOLECULE IN A MAGNETIC FIELD

14. C.H.TOWNES,PHYS.REV.71,909-910(1947) ELECTROSTATIC FIELD STRENGTHS IN MOLECULES AND NUCLEAR QUADRUPOLE MOMENTS

15. C.H.TOWNES,A.N.HOLDEN,J.BARDEEN,AND F.R.MERRITT, PHYS.REV.71,644-645 (1947) THE QUADRUPOLE MOMENTS AND SPINS OF BR,CL,AND N NUCLEI ERRATA-PHYS.REV.71,829(1947)

16. J.H.VAN VLECK,PHYS.REV.71,468-469(1947) FORMULA FOR THE COUPLING OF NUCLEAR QUADRUPOLE MOMENTS IN SYMMETRICAL POLYATOMIC MOLECULES

17. R.J.WATTS AND D.WILLIAMS,PHYS.REV.72,263-265(1947) NUCLEAR QUADRUPOLE MOMENT EFFECTS IN THE INVERSION SPECTRUM OF AMMONIA

18. R.J.WATTS AND D.WILLIAMS,PHYS.REV.71,639(1947) NUCLEAR QUADRUPOLE MOMENT EFFECTS IN THE MICROWAVE SPECTRUM OF AMMONIA

19. J.BARDEEN AND C.H.TOWNES,PHYS.REV.73,97-105(1948) CALCULATION OF NUCLEAR QUADRUPOLE EFFECTS IN MOLECULES

20. J.BARDEEN AND C.H.TOWNES,PHYS.REV.73,627-629(1948) SECOND-ORDER CORRECTIONS TO QUADRUPOLE EFFECTS IN MOLECULES ERRATA-PHYS.REV. 73,1204(1948)

21. J.K.BRAGG,PHYS.REV. 74,533-538(1948) THE INTERACTION OF NUCLEAR ELECTRIC QUADRUPOLE MOMENTS WITH MOLECULAR ROTATION IN ASYMMETRIC-TOP MOLECULES.I.

22. W.GORDY,H.RING, AND A.B.BURG,PHYS.REV.74,1191(1948) NUCLEAR SPINS AND QUADRUPOLE MOMENTS OF B(10) AND B(11)

23. G.KNIGHT AND B.T.FELD,PHYS.REV.74,354 (1948) INTERACTION OF NUCLEAR QUADRUPOLE MOMENTS WITH MOLECULAR ROTATION IN SLIGHTLY ASYMMETRIC ROTOR MOLECULES

24. A.G.SMITH,H.RING,W.V.SMITH,AND W.GORDY,PHYS.REV.73,633(1948) NUCLEAR QUADRUPOLE COUPLING OF NITROGEN IN ICN AND N2O

25. C.H.TOWNES AND S.GESCHWIND,PHYS.REV.74,626-627(1948) SPIN AND QUADRUPOLE MOMENT OF S(33)

26. J.W.TRISCHKA,PHYS.REV.74,718-727(1948) NUCLEAR QUADRUPOLE INTERACTION IN CSF

27. R.T.WEIDNER,PHYS.REV.73,254(1948) NUCLEAR QUADRUPOLE INTERACTION IN THE ICL SPECTRUM

28. J.K.BRAGG AND S.GOLDEN,PHYS.REV.75,735-738(1949) THE INTERACTION OF NUCLEAR ELECTRIC QUADRUPOLE MOMENTS WITH MOLECULAR ROTATION IN ASYMMETRIC TOP MOLECULES. II.APPROXIMATE METHODS FOR FIRST-ORDER COUPLING

29. V.W.COHEN,W.S.KOSKI, AND T.WENTINK,PHYS.REV.76,703-704(1949) NUCLEAR SPIN AND QUADRUPOLE COUPLING OF S(35)

30. J.H.GOLDSTEIN AND J.K.BRAGG,PHYS.REV.75,1453-1454(1949) NUCLEAR QUADRUPOLE EFFECTS IN THE MICROWAVE SPECTRUM OF THE ASYMMETRIC TOP MOLECULE,VINYL CHLORIDE

31. P.KUSCH,PHYS.REV.75,887-888(1949) ON THE NUCLEAR QUADRUPOLE MOMENT OF LI(6)

32. R.LIVINGSTON,O.R.GILLIAM, AND W.GORDY,PHYS.REV.76,149-150(1949) THE NUCLEAR SPIN AND QUADRUPOLE MOMENT OF I(129)

33. C.H.TOWNES AND L.C.AAMODT,PHYS.REV.76,691-692(1949) NUCLEAR SPIN AND QUADRUPOLE MOMENT OF CL(36)

34. C.H.TOWNES AND B.P.DAILEY,J.CHEM.PHYS.17,782-796(1949) DETERMINATION OF ELECTRONIC STRUCTURE OF MOLECULES FROM NUCLEAR QUADRUPOLE EFFECTS

35. C.H.TOWNES,H.M.FOLEY,AND W.LOW,PHYS.REV.76,1415-1416(1949) NUCLEAR QUADRUPOLE MOMENTS AND NUCLEAR SHELL STRUCTURE

36. C.H.TOWNES,J.M.MAYS,AND B.P.DAILEY,PHYS.REV.76,700(1949) EVIDENCE ON NUCLEAR MOMENTS OF STABLE GE AND SI ISOTOPES FROM MICROWAVE SPECTRA

37. R.BERSOHN,J.CHEM.PHYS.18,1124-1125(1950) QUADRUPOLE COUPLING OF THREE NUCLEI IN A ROTATING MOLECULE

38. J.H.GOLDSTEIN AND J.K.BRAGG,PHYS.REV.78,347 (1950) DETERMINATION OF DOUBLE BOND CHARACTER FROM THE MICROWAVE SPECTRUM OF PLANAR ASYMMETRIC TOP MOLECULES WITH A QUADRUPOLE NUCLEUS

39. J.RAINWATER,PHYS.REV.79,432-434(1950) NUCLEAR ENERGY LEVEL ARGUMENT FOR A SPHEROIDAL NUCLEAR MODEL

40. N.F.RAMSEY,PHYS.REV.78,221-222(1950) QUADRUPOLE MOMENT OF THE ELECTRON DISTRIBUTION IN HYDROGEN MOLECULES

41. R.STERNHEIMER,PHYS.REV.80,102-103(1950) ON NUCLEAR QUADRUPOLE MOMENTS

42. C.H.TOWNES AND B.P.DAILEY,PHYS.REV.78,346-347 (1950) NUCLEAR QUADRUPOLE COUPLING AND IONIC CHARACTER OF MOLECULES

43. M.T.WEISS,M.W.P.STRANDBERG,R.B.LAWRENCE,AND C.C.LOOMIS,PHYS.REV. 78,202-204(1950) ON THE NUCLEAR SPIN OF B(10)

44. S.GESCHWIND,R.GUNTHER-MOHR,AND C.H.TOWNES,PHYS.REV.81,288-289(1951) RATIO OF QUADRUPOLE MOMENTS OF CL(35) AND CL(37)

45. W.GORDY,J.CHEM.PHYS.19,792-793(1951) INTERPRETATION OF NUCLEAR QUADRUPOLE COUPLINGS IN MOLECULES

46. C.M.JOHNSON,W.GORDY, AND R.LIVINGSTON,PHYS.REV.83,1249(1951) ON THE SPIN AND QUADRUPOLE MOMENT OF CL(36)

47. J.M.MAYS AND C.H.TOWNES,PHYS.REV.81,940-941(1951) THE NUCLEAR SPINS AND QUADRUPOLE MOMENTS OF STABLE GERMANIUM ISOTOPES

48. M.MIZUSHIMA AND T.ITO,J.CHEM.PHYS.19,739-744(1951) ON THE HYPERFINE STRUCTURE OF THE ROTATIONAL SPECTRA OF XYZ3-TYPE MOLECULE,WHERE NUCLEI Z HAVE ELECTRIC QUADRUPOLE MOMENTS

49. C.H.TOWNES,PHYSICA 17,354-377(1951) DETERMINATION OF NUCLEAR PROPERTIES BY MICROWAVE SPECTROSCOPY

50. L.C.BIEDENHARN,J.M.BLATT, AND M.E.ROSE,REVS.MOD.PHYS.24,249-257(1952) SOME PROPERTIES OF THE RACAH AND ASSOCIATED COEFFICIENTS

51. J.DUCHESNE,J.CHEM.PHYS.20,1804-1805(1952) NUCLEAR QUADRUPOLE COUPLING CONSTANTS AND MOLECULAR VIBRATIONS

52. S.GESCHWIND,G.R.GUNTHER-MOHR,AND G.SILVEY,PHYS.REV.85,474-477(1952) THE SPIN AND QUADRUPOLE MOMENT OF O(17)

53. D.A.GILBERT,PHYS.REV.85,716 (1952) THE NUCLEAR SPIN OF CL(36) FROM THE MICROWAVE SPECTRUM OF C(12)H3CL(36)

54. W.A.HARDY,G.SILVEY, AND C.H.TOWNES,PHYS.REV.85,494-495(1952) THE SPIN AND QUADRUPOLE MOMENT OF SE(79)

55. A.JAVAN AND C.H.TOWNES,PHYS.REV.86,608 (1952) ANOMALIES IN THE HYPERFINE STRUCTURE OF ICN

56. R.A.LOGAN,R.E.COTE,AND P. KUSCH ,PHYS.REV.86,280-287(1952) THE SIGN OF THE QUADRUPOLE INTERACTION ENERGY IN DIATOMIC MOLECULES

57. R.J.MYERS AND W.D.GWINN,J.CHEM.PHYS.20,1420-1427(1952) THE MICROWAVE SPECTRA,DIPOLE MOMENT,AND CHLORINE NUCLEAR QUADRUPOLE COUPLING CONSTANTS OF METHYLENE CHLORIDE

58. J.D.ROGERS AND D.WILLIAMS,PHYS.REV.86,654 (1952) NUCLEAR QUADRUPOLE INTERACTIONS IN THE MICROWAVE SPECTRUM OF HYDROGEN AZIDE

59. C.H.TOWNES AND B.P.DAILEY,J.CHEM.PHYS.20,35-40(1952) NUCLEAR QUADRUPOLE EFFECTS AND ELECTRONIC STRUCTURE OF MOLECULES IN THE SOLID STATE

60. T.C.WANG,C.H.TOWNES,A.L.SCHAWLOW,AND A.N.HOLDEN,PHYS.REV.86,809-810 (1952) QUADRUPOLE COUPLING RATIO OF THE CHLORINE ISOTOPES

61. H.G.DEHMELT,PHYS.REV.91,313-314(1953) NUCLEAR QUADRUPOLE RESONANCE IN RHOMBIC SULFUR AND THE QUADRUPOLE MOMENTS OF S(33) AND S(35)

62. I.I.GOLDMAN,DOKLADY AKAD.NAUK.SSSR 88,241-243(1953) ON THE SPECTROSCOPIC DETERMINATION OF THE QUADRUPOLE MOMENTS OF NUCLEI

63. W.A.HARDY,G.SILVEY,C.H.TOWNES,B.F.BURKE,M.W.P.STRANDBERG, G.W.PARKER, AND V.W.COHEN,PHYS.REV.92,1532-1537(1953) THE NUCLEAR MOMENT OF SE(79)

64. A.JAVAN,G.SILVEY,C.H.TOWNES,AND A.V.GROSSE,PHYS.REV.91,222-223 (1953) ON THE QUADRUPOLE MOMENTS OF MN(35),RE(185),AND RE(187)

65. P.KUSCH,PHYS.REV.92,268-270(1953) SIGN OF THE QUADRUPOLE INTERACTION OF LI(6) IN LICL

66. R.LIVINGSTON,B.M.BENJAMIN,J.T.COX,AND W.GORDY,PHYS.REV.92,1271-1272 (1953) THE NUCLEAR SPIN AND QUADRUPOLE MOMENT OF I(131)

67. S.-Y.OBI,T.ISHIDZU,H.HORIE,S.YANAGAWA,Y.TANABE,AND M.SATO, ANN.TOKYO ASTRON.OBS.3,89-142(1953) TABLES OF THE RACAH COEFFICIENTS W(ABCD,EF) I.COEFFICIENTS HAVING ALL THEIR VARIABLES INTEGRAL

68. N.F.RAMSEY,PHYS.REV.89,527(1953) PSEUDO-QUADRUPOLE EFFECT FOR NUCLEI IN MOLECULES

69. G.W.ROBINSON AND C.D.CORNWELL,J.CHEM.PHYS.21,1436-1442(1953) THE INTERACTION WITH MOLECULAR ROTATION OF THE NUCLEAR ELECTRIC QUADRUPOLE MOMENTS OF TWO NUCLEI HAVING SPINS 3/2

70. R.L.WHITE,PHYS.REV.91,1014(1953) QUADRUPOLE COUPLING OF THE DEUTERON IN DCCCL AND DCN

71. R.L.WHITE AND C.H.TOWNES,PHYS.REV.92,1256-1257(1953) THE SPIN OF SI(29) AND MASS RATIOS OF THE STABLE SI ISOTOPES

72. L.C.AAMODT,P.C.FLETCHER,G.SILVEY,AND C.H.TOWNES,PHYS.REV.94,789 (1954) THE SPIN AND QUADRUPOLE MOMENT OF SE(75)

73. G.R.BIRD AND C.H.TOWNES,PHYS.REV.94,1203-1208(1954) SULFUR BONDS AND THE QUADRUPOLE MOMENTS OF O,S,AND SE ISOTOPES

74. H.M.FOLEY,R.M.STERNHEIMER,AND D.TYCKO,PHYS.REV.93,734-742(1954) NUCLEAR QUADRUPOLE COUPLING IN POLAR MOLECULES

75. W.GORDY,J.CHEM.PHYS.22,1470-1471(1954) RELATION OF NUCLEAR QUADRUPOLE COUPLINGS TO THE CHEMICAL BOND

76. J.A.KRAITCHMAN AND B.P.DAILEY,J.CHEM.PHYS.22,1477-1481(1954) VARIATION IN THE QUADRUPOLE COUPLING CONSTANT WITH VIBRATIONAL STATE IN THE METHYL HALIDES

77. H.W.MORGAN AND J.H.GOLDSTEIN,J.CHEM.PHYS.22,1427-1429(1954) SECOND-ORDER QUADRUPOLE EFFECTS IN ASYMMETRIC TOPS. THE MICROWAVE SPECTRUM OF VINYL IODIDE

78. N.F.RAMSEY,NUCLEAR MOMENTS,JOHN WILEY AND SONS INC.NEW YORK(1954)

79. P.N.SCHATZ,J.CHEM.PHYS.22,755(1954) DEDUCTIONS ABOUT HYBRIDIZATION FROM NUCLEAR QUADRUPOLE COUPLING CONSTANTS

80. R.M.STERNHEIMER,PHYS.REV.95,736-750(1954) EFFECT OF THE ATOMIC CORE ON THE NUCLEAR QUADRUPOLE COUPLING

81. F.STERZER AND Y.BEERS,PHYS.REV.94,1410 (1954) PURE QUADRUPOLE SPECTRUM OF METHYL IODIDE VAPOR

82. L.C.AAMODT AND P.C.FLETCHER,PHYS.REV.98,1224-1229(1955) SPIN, QUADRUPOLE MOMENT, AND MASS OF SELENIUM-75

83. B.P.DAILEY,DIS.FARADAY SOC.19,255-259(1955) THE INTERPRETATION OF QUADRUPOLE SPECTRA

84. B.P.DAILEY AND C.H.TOWNES,J.CHEM.PHYS.23,118-123(1955) THE IONIC CHARACTER OF DIATOMIC MOLECULES

85. W.GORDY,DIS.FARADAY SOC.19,14-29(1955) QUADRUPOLE COUPLINGS, DIPOLE MOMENTS,AND THE CHEMICAL BOND

86. A.JAVAN,PHYS.REV.99,1302-1306(1955) EFFECTS OF THE BENDING MODE OF VIBRATION ON THE HYPERFINE STRUCTURE OF ICN

87. F.STERZER AND Y.BEERS,PHYS.REV.100,1174-1180(1955) PURE QUADRUPOLE SPECTRA OF CH3I AND CF3I VAPORS

88. R.L.WHITE,J.CHEM.PHYS.23,249-252(1955) NUCLEAR QUADRUPOLE INTERACTION IN HCN AND DCN IN THE BENDING VIBRATIONAL MODE

89. R.L.WHITE,J.CHEM.PHYS.23,253-255(1955) QUADRUPOLE COUPLING OF THE DEUTERON IN DCCCL AND DCN

90. J.H.GOLDSTEIN,J.CHEM.PHYS.24,106-109(1956) QUADRUPOLE COUPLING AND BOND CHARACTER IN THE VINYL HALIDES

91. D.R.LIDE,JR.,BULL.AM.PHYS.SOC.(2) 1,13(1956) NUCLEAR QUADRUPOLE

INTERACTIONS IN THE MICROWAVE SPECTRA OF INTERNALLY ROTATING MOLECULES

92. T.OKA AND H.HIRAKAWA,J.PHYS.SOC.JAPAN 12,820-823(1957) MICROWAVE SPECTRUM OF BRCN AND DEPENDENCE OF QUADRUPOLE COUPLING CONSTANT ON THE VIBRATIONAL STATE

93. D.W.POSENER,AUST.J.PHYS.10,376-385(1957) HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF WATER. I. QUADRUPOLE COUPLING IN DEUTERATED WATER

94. M.E.ROSE,ELEMENTARY THEORY OF ANGULAR MOMENTUM,JOHN WILEY ,INC., NEW YORK(1957)

95. B.ROSENBLUM AND A.H.NETHERCOT,JR.,J.CHEM.PHYS.27,828-829(1957) QUADRUPOLE COUPLING CONSTANT AND MOLECULAR STRUCTURE OF CARBON MONOXIDE-O(17)

96. M.J.STEVENSON AND C.H.TOWNES,PHYS.REV.107,716-723(1957) QUADRUPOLE MOMENT OF OXYGEN-17

97. T.P.DAS AND E.L.HAHN,NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY, ACADEMIC PRESS INC.,NEW YORK(1958)

98. P.C.FLETCHER AND E.AMBLE,PHYS.REV.110,536-543(1958) SPIN AND QUADRUPOLE MOMENT OF IODINE-125 AND MAGNETIC MOMENT OF IODINE-131

99. R.H.JACKSON AND D.J.MILLEN,PROC.CHEM.SOC.(LONDON)1959,10(1959) MICROWAVE SPECTRUM AND NUCLEAR QUADRUPOLE COUPLING COEFFICIENTS FOR CHLORINE MONOXIDE

100. Y.KIKUCHI,E.HIROTA,AND Y.MORINO,J.CHEM.PHYS.31,1139-1140(1959) SECOND ORDER QUADRUPOLE EFFECT IN THE MICROWAVE SPECTRUM OF PROPARGYL BROMIDE

101. J.K.WILMSHURST,J.CHEM.PHYS.30,561-565(1959) EMPIRICAL EXPRESSION FOR IONIC CHARACTER AND THE DETERMINATION OF S HYBRIDIZATION FROM NUCLEAR QUADRUPOLE COUPLING CONSTANTS

102. J.A.HOWE,J.CHEM.PHYS.34,1247-1249(1961) MICROWAVE SPECTRUM OF CIS-1-CHLORO-2 FLUOROETHYLENE

103. Y.KIKUCHI,E.HIROTA,AND Y.MORINO,BULL.CHEM.SOC.JAPAN 34,348-353(1961) MICROWAVE SPECTRA OF PROPARGYL HALIDES II. MOLECULAR STRUCTURE AND SECOND ORDER QUADRUPOLE EFFECT OF PROPARGYL BROMIDE

104. W.H.FLYGARE AND W.D.GWINN,J.CHEM.PHYS.36,787-794(1962) ELECTRON DISTRIBUTION IN THE C-CL BONDS OF CH2CL2 AND DERIVATION OF MATRIX ELEMENTS OFF-DIAGONAL IN J FOR TWO QUADRUPOLAR NUCLEI IN AN ASYMMETRIC ROTOR

105. W.H.FLYGARE AND J.A.HOWE,J.CHEM.PHYS.36,440-443(1962) MICROWAVE SPECTRUM AND QUADRUPOLE INTERACTION IN CIS-1,2-DICHLOROETHYLENE

106. W.H.FLYGARE,A.NARATH,AND W.D.GWINN,J.CHEM.PHYS.36,200-208(1962) MICROWAVE SPECTRUM,STRUCTURE,QUADRUPOLE INTERACTION,DIPOLE MOMENT, AND BENT C-CL BONDS IN 1,1-DICHLOROCYCLOPROPANE

107. C.T.OKONSKI,DETERMINATION OF ORGANIC STRUCTURES BY PHYSICAL METHODS,VOL.II.CHAPTER 11, NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY, ACADEMIC PRESS INC.NEW YORK(1962)

108. R.A.FURMAN AND D.R.LIDE,JR.,J.CHEM.PHYS.39,1133-1134(1963) QUADRUPOLE COUPLING CONSTANTS FROM THE MICROWAVE SPECTRUM OF HYDRAZOIC ACID

109. W.H.FLYGARE,J.MOL.SPECTRY 14,145-155(1964) THE MICROWAVE SPECTRUM, PARTIAL STRUCTURE,AND QUADRUPOLE COUPLING CONSTANTS IN 1,1-DICHLOROETHANE

110. W.H.FLYGARE,J.CHEM.PHYS.41,206-214(1964) EXPERIMENTAL DETERMINATION OF THE FIELD GRADIENT AT THE DEUTERON IN FORMALDEHYDE

111. J.T.LOWE AND W.H.FLYGARE,J.CHEM.PHYS.41,2153-2158(1964) CALCULATION OF THE FIELD GRADIENT AT THE DEUTERIUM IN FORMALDEHYDE

112. R.H.SCHWENDEMAN,J.MOL.SPECTRY 15,451-461(1965) MATRIX ELEMENTS OF SOME PRODUCTS OF DIRECTION COSINES AND SECOND-ORDER QUADRUPOLE COUPLING CALCULATIONS

Section VIII. HINDERED INTERNAL ROTATION

Studies of internal rotation by microwave spectroscopy have been favored by the relative barrier heights hindering internal rotation in methyl groups and the relatively low vibrational frequencies associated with these torsional motions. Most of the barriers for CH_3-X type molecules, where X represents the frame of the molecule, fall in the region from 1-4 kilocalories which allows splitting of rotational transitions by rotation-internal rotation interactions to be observed either in the ground vibrational state or in excited torsional states. The latter is usually the vibrational modes of lowest frequency and is relatively well populated.

The theoretical methods to be applied to single top molecules have been reviewed by Lin and Swalen.[100] In most cases the problem consists of a symmetric top attached to an asymmetric frame.[52,70] Extensions have been made to treat two-top molecules,[118-120] asymmetric top and frame,[39,136] cis-gauche-trans configurations of C-C bonds,[122,123,147] and symmetric top molecules through excited states[87,88] and Coriolis effects.[140]

Herschbach[134] has listed the barrier values determined through 1962 in a complete review of experimental results.

1. H.H.NIELSEN,PHYS.REV.40,445-456(1932) THE TORSION OSCILLATOR-ROTATOR IN THE QUANTUM MECHANICS

2. J.B.HOWARD,J.CHEM.PHYS.5,451-459(1937) THE ROTATION-VIBRATION SPECTRUM OF C2H6 AND THE QUESTION OF FREE INTERNAL ROTATION

3. E.GORIN,J.WALTER,AND H.EYRING,J.AM.CHEM.SOC.61,1876-1886(1939) INTERNAL ROTATION AND RESONANCE IN HYDROCARBONS

4. B.L.CRAWFORD,J.CHEM.PHYS.8,273-281(1940) THE PARTITION FUNCTIONS AND ENERGY LEVELS OF MOLECULES WITH INTERNAL TORSIONAL MOTIONS

5. J.S.KOEHLER AND D.M.DENNISON,PHYS.REV.57,1006-1021(1940) HINDERED ROTATION IN METHYL ALCOHOL

6. D.PRICE,J.CHEM.PHYS.9,807-815(1941) THE PARTITION FUNCTIONS OF MOLECULES WITH INTERNAL TORSION. I.SINGLE ASYMMETRIC TOP ATTACHED TO RIGID FRAMEWORK. ERRATUM-J.CHEM.PHYS.10,80(1942)

7. K.S.PITZER AND W.D.GWINN,J.CHEM.PHYS.10,428-440(1942) ENERGY LEVELS AND THERMODYNAMIC FUNCTIONS FOR MOLECULES WITH INTERNAL ROTATION . I.RIGID FRAME WITH ATTACHED TOPS

8. J.G.ASTON,S.ISSEROW,G.J.SZASZ,AND R.M.KENNEDY,J.CHEM.PHYS.12,336-344 (1944) AN EMPIRICAL CORRELATION AND METHOD OF CALCULATION OF BARRIERS HINDERING INTERNAL ROTATION

9. F.A.FRENCH AND R.S.RASMUSSEN,J.CHEM.PHYS.14,389-394(1946) A RELATION BETWEEN INTERNUCLEAR DISTANCES AND POTENTIAL BARRIERS OF METHYL GROUPS

10. K.S.PITZER,J.CHEM.PHYS.14,239-243(1946) ENERGY LEVELS AND THERMODYNAMIC FUNCTIONS FOR MOLECULES WITH INTERNAL ROTATION. II. UNSYMMETRICAL TOPS ATTACHED TO A RIGID FRAME.

11. E.N.LASETTRE AND L.B.DEAN,J.CHEM.PHYS.16,151-152(1948) ORIGIN OF THE POTENTIAL BARRIER HINDERING ROTATION IN ETHANE AND RELATED SUBSTANCES

12. B.P.DAILEY,H.MINDEN,AND R.G.SHULMAN,PHYS.REV.75,1319 (1949) TORSION VIBRATIONAL STATES OF CH3CF3

13. J.E.KILPATRICK AND K.S.PITZER,J.CHEM.PHYS.17,1064-1075(1949) ENERGY LEVELS AND THERMODYNAMIC FUNCTIONS FOR MOLECULES WITH INTERNAL ROTATION. III. COMPOUND ROTATION

14. E.N.LASSETTRE AND L.B.DEAN,J.CHEM.PHYS.17,317-332(1949) AN ELECTROSTATIC THEORY OF THE POTENTIAL BARRIERS HINDERING ROTATION AROUND SINGLE BONDS

15. J.O.HALFORD,J.CHEM.PHYS.18,444-448(1950) ENERGY LEVELS AND THERMODYNAMIC PROPERTIES OF THE INTERNAL ROTATOR

16. D.R.LIDE,JR. AND D.K.COLES,PHYS.REV.80,911(1950) MICROWAVE SPECTROSCOPIC EVIDENCE FOR INTERNAL ROTATION IN METHYL SILANE

17. P.TORKINGTON,J.CHEM.PHYS.18,407-413(1950) THE MOMENTS OF INERTIA

OF MOLECULES WITH INTERNAL ROTATION

18. H.T.MINDEN AND B.P.DAILEY,PHYS.REV.82,338 (1951) HINDERED ROTATION IN CH3CF3 AND CH3SIF3

19. L.J.OOSTERHOFF,DIS. FARADAY SOC.10,79-87(1951) RESTRICTED ROTATION IN ETHANE

20. K.S.PITZER,DIS.FARADAY SOC.10,66-73(1951) POTENTIAL ENERGIES FOR ROTATION ABOUT SINGLE BONDS

21. TABLES RELATING TO MATHIEU FUNCTIONS,COLUMBIA UNIVERSITY PRESS, NEW YORK(1951)

22. B.P.DAILEY,ANN.N.Y. ACAD.SCI.55,915-927(1952) HINDERED ROTATION AND MICROWAVE SPECTROSCOPY

23. H.T.MINDEN,J.CHEM.PHYS.20,1964-1965(1952) THE COMPLETE SYMMETRY GROUP FOR INTERNAL ROTATION IN CH3CF3 AND LIKE MOLECULES

24. S.MIZUSHIMA,Y.MORINO,AND T.SHIMANOUCHI,PHYS.CHEM.56,324-326(1952) SOME PROBLEMS OF INTERNAL ROTATION

25. J.VAN DRANEN,J.CHEM.PHYS.20,1982-1983(1952) BORN REPULSION AND RESTRICTED FREE ROTATION

26. B.BAK,L.HANSEN,AND J.RASTRUP-ANDERSEN,J.CHEM.PHYS.21,1612-1613(1953) EXPERIMENTAL EVIDENCE OF RESTRICTED ROTATION IN CH3CCCF3

27. D.G.BURKHARD,J.CHEM.PHYS.21,1541-1549(1953) HINDERED ROTATION INVOLVING TWO ASYMMETRIC GROUPS

28. N.W.LUFT,J.CHEM.PHYS.21,179(1953) ASYMMETRIC INTERNAL ROTATIONAL BARRIERS ABOUT SINGLE BONDS

29. N.W.LUFT,TRANS.FARADAY SOC.49,118-121(1953) INTERNAL POTENTIAL BARRIERS IN SATURATED HYDROCARBONS

30. A.-C.TANG,SCI.SINICA 3,279-299(1954) THE PROBLEM OF INTERNAL ROTATIONS OF MOLECULES

31. D.KIVELSON,J.CHEM.PHYS.22,1733-1739(1954) THEORY OF THE INTERACTION OF HINDERED INTERNAL ROTATION WITH OVER-ALL ROTATIONS. I. SYMMETRIC ROTORS-METHYL SILANE
ERRATA- J.CHEM.PHYS.27,980(1957)

32. D.R.LIDE,JR.,J.CHEM.PHYS.22,1613-1614(1954) EFFECTS OF INTERNAL MOTION IN THE MICROWAVE SPECTRUM OF METHYL AMINE

33. N.W.LUFT,J.CHEM.PHYS.22,155-156(1954) ASSIGNMENT OF TORSIONAL FREQUENCIES IN SOME HALOGENATED ETHANES

34. N.W.LUFT,J.CHEM.PHYS.22,1814-1820(1954) MAGNITUDES OF BARRIERS IN INTRAMOLECULAR ROTATION

35. M.MIZUSHIMA,STRUCTURE OF MOLECULES AND INTERNAL ROTATION, ACADEMIC PRESS,NEW YORK(1954)

36. A-C TANG,SCIENTIA SINICA(PEKING)3,279-299(1954) INTERNAL ROTATION

IN MOLECULES

37. E.TANNENBAUM,R.D.JOHNSON,R.J.MYERS,AND W.D.GWINN,J.CHEM.PHYS.22,949 (1954) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION OF NITROMETHANE

38. G.BLANCH AND I.RHODES,WASH.ACAD.SCI.45,166-196(1955) TABLE OF CHARACTERISTIC VALUES OF MATHIEUS EQUATION FOR LARGE VALUES OF THE PARAMETER

39. D.G.BURKHARD AND J.C.IRVIN,J.CHEM.PHYS.23,1405-1414(1955) SOLUTION OF THE WAVE EQUATION FOR INTERNAL ROTATION OF TWO COMPLETELY ASYMMETRIC MOLECULES
ERRATUM-J.CHEM.PHYS.23,2469(1955)

40. E.V.IVASH,J.C.M.LI,AND K.S.PITZER,J.CHEM.PHYS.23,1814-1818(1955) THERMODYNAMIC PROPERTIES OF IDEAL GASEOUS METHANOL

41. R.W.KI' B,J.CHEM.PHYS.23,1736-1737(1955) INTERNAL BARRIER HEIGHT OF METHYL MERCAPTAN

42. D.KIVELSON,J.CHEM.PHYS.23,2230-2235(1955) THEORY OF INTERNAL OVER-ALL ROTATIONAL INTERACTIONS. II. HAMILTONIAN FOR THE NON-RIGID INTERNAL ROTOR

43. D.KIVELSON,J.CHEM.PHYS.23,2236-2243(1955) THEORY OF INTERNAL OVERALL ROTATIONAL INTERACTIONS. III. NON-RIGID ASYMMETRIC ROTORS
ADDENDUM-J.CHEM.PHYS.27,980(1957)

44. D.R.LIDE,JR.AND D.KIVELSON,J.CHEM.PHYS.23,2191(1955) INTERNAL ROTATION IN METHYL-TRIFLUOROMETHYL ACETYLENE

45. N.W.LUFT,Z.ELEKTROCHEM.59,46-55(1955) INTRA-MOLECULAR TORSIONAL VIBRATIONS

46. E.A.MASON AND M.M.KREEVOY,J.AM.CHEM.SOC.77,5808-5814(1955) A SIMPLE MODEL FOR BARRIERS TO INTERNAL ROTATION

47. J.T.MASSEY AND R.W.HART,J.CHEM.PHYS.23,942-946(1955) EFFECT OF A HIGH CIS-BARRIER ON THE MICROWAVE SPECTRUM OF HYDROGEN PEROXIDE

48. H.T.MINDEN,PHYS.REV.98,1160(1955) MOLECULAR DISTORTION CAUSED BY HINDERED ROTATION

49. J.D.SWALEN,J.CHEM.PHYS.23,1739-1740(1955) STRUCTURE AND POTENTIAL BARRIER TO HINDERED ROTATION IN METHYL ALCOHOL

50. P.R.SWAN AND M.W.P.STRANDBERG,PHYS.REV.99,667 (1955) EXCITED TORSIONAL STATES IN ASYMMETRIC HINDERED ROTORS

51. R.S.WAGNER AND B.P.DAILEY,J.CHEM.PHYS.23,1355(1955) PROOF OF THE STAGGERED CONFIGURATION OF ETHYL CHLORIDE

52. E.B.WILSON,JR.,C.C.LIN,AND D.R.LIDE,JR.,J.CHEM.PHYS.23,136-142(1955) CALCULATION OF ENERGY LEVELS FOR INTERNAL TORSION AND OVERALL ROTATION. I. CH3BF2 TYPE MOLECULES

53. B.BAK,J.CHEM.PHYS.24,918-919(1956) CALCULATION OF POTENTIAL BARRIERS FOR ETHANE-LIKE SYMMETRIC TOPS

54. D.G.BURKHARD,TRANS.FARADAY SOC.52,1-6(1956) HINDERED ROTATION IN SYMMETRIC-ASYMMETRIC MOLECULES

55. T.P.DAS,J.CHEM.PHYS.25,896-903(1956) TUNNELING THROUGH HIGH PERIODIC BARRIERS I.

56. D.R.HERSCHBACH,J.CHEM.PHYS.25,358-359(1956) INTERNAL BARRIER IN CH3CH2F AND CH3CHF2 FROM TORSIONAL SATELLITES

57. R.W.KILB,TABLES OF MATHIEU EIGENVALUES AND MATHIEU EIGNEFUNCTIONS FOR SPECIAL BOUNDARY CONDITIONS,DEPARTMENT OF CHEMISTRY,HARVARD UNIVERSITY(1956)

58. J.C.M.LI AND K.S.PITZER,J.PHYS.CHEM.60,466-474(1956) ENERGY LEVELS AND THERMODYNAMIC FUNCTIONS FOR MOLECULES WITH INTERNAL ROTATION. IV. EXTENDED TABLES FOR MOLECULES WITH SMALL MOMENTS OF INERTIA

59. C.C.LIN AND R.W.KILB,J.CHEM.PHYS.24,631(1956) MICROWAVE SPECTRUM AND INTERNAL BARRIER OF ACETALDEHYDE

60. T.NISHIKAWA,J.PHYS.SOC.JAPAN 11,781-786(1956) FINE STRUCTURE OF J=1-0 TRANSITION DUE TO INTERNAL ROTATION IN METHYL ALCOHOL

61. J.D.SWALEN,J.CHEM.PHYS.24,1072-1074(1956) CALCULATION OF ENERGY LEVELS IN MOLECULES WITH INTERNAL TORSION

62. E.TANNENBAUM,R.J.MYERS,AND W.D.GWINN,J.CHEM.PHYS.25,42-47(1956) MICROWAVE SPECTRA,DIPOLE MOMENT,AND BARRIER TO INTERNAL ROTATION OF CH3NO2 AND CD3NO2

63. T.DAS,J.CHEM.PHYS.27,763-781(1957) TUNNELING THROUGH HIGH PERIODIC BARRIERS. II. APPLICATION TO NUCLEAR MAGNETIC RESONANCE IN SOLIDS

64. J.O.HALFORD,J.CHEM.PHYS.26,851-855(1957) PARTITION FUNCTION FOR INTERNAL ROTATION IN METHANOL AND SIMILAR MOLECULAR MODELS

65. K.T.HECHT AND D.M.DENNISON,J.CHEM.PHYS.26,31-47(1957) HINDERED ROTATION IN MOLECULES WITH RELATIVELY HIGH POTENTIAL BARRIERS

66. K.T.HECHT AND D.M.DENNISON,J.CHEM.PHYS.26,48-69(1957) VIBRATION-HINDERED ROTATION INTERACTIONS IN METHYL ALCOHOL. THE J=0-1 TRANSITION

67. D.R.HERSCHBACH, TABLES FOR THE INTERNAL ROTATION PROBLEM , DEPARTMENT OF CHEMISTRY,HARVARD UNIVERSITY(1957)

68. D.R.HERSCHBACH,J.CHEM.PHYS.27,975(1957) TABLES OF MATHIEU INTEGRALS FOR THE INTERNAL ROTATION PROBLEM

69. D.R.HERSCHBACH,J.CHEM.PHYS.27,1420-1421(1957) COMMENTS ON THE INTERNAL ROTATION PROBLEM

70. R.W.KILB,C.C.LIN,AND E.B.WILSON,JR.,J.CHEM.PHYS.26,1695-1703(1957) CALCULATION OF ENERGY LEVELS FOR INTERNAL TORSION AND OVERALL ROTATION. II. ACETALDEHYDE-TYPE MOLECULES-ACETALDEHYDE SPECTRA

71. R.W.KILB AND L.PIERCE,J.CHEM.PHYS.27,108-112(1957) MICROWAVE

SPECTRUM,STRUCTURE,AND INTERNAL BARRIER OF METHYL SILANE

72. M.M.KREEVOY AND E.A.MASON,J.AM.CHEM.SOC.79,4851-4854(1957) A SIMPLE MODEL FOR BARRIERS TO INTERNAL ROTATION. II. ROTATIONAL ISOMERS

73. D.R.LIDE,JR. AND D.E.MANN,J.CHEM.PHYS.27,868-873(1957) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION I. PROPYLENE

74. D.R.LIDE,JR. AND D.E.MANN,J.CHEM.PHYS.27,874-877(1957) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION. II. METHYLALLENE

75. Y.MASHIKO,NIPPON KAGAKU ZASSHI 78,1131-1139(1957) POTENTIAL ENERGY SURFACE FOR TORSIONAL OSCILLATIONS IN DIMETHYL ETHER

76. R.E.NAYLOR,JR. AND E.B.WILSON,JR.,J.CHEM.PHYS.26,1057-1060(1957) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION IN CH3BF2

77. T.NISHIKAWA,J.PHYS.SOC.JAPAN 12,668-680(1957) MICROWAVE STUDIES OF THE INTERNAL MOTION AND STRUCTURE OF METHYLAMINE

78. S.SIEGEL,J.CHEM.PHYS.27,989-990(1957) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION FOR TRANS-FLUOROPROPYLENE

79. J.D.SWALEN AND D.R.HERSCHBACH,J.CHEM.PHYS.27,100-108(1957) INTERNAL BARRIER OF PROPYLENE OXIDE FROM THE MICROWAVE SPECTRUM. I.

80. W.J.TABOR,J.CHEM.PHYS.27,974-975(1957) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION OF ACETIC ACID

81. E.B.WILSON,JR.,PROC.NATL.ACAD.SCI.U.S.43,816-820(1957) ON THE ORIGIN OF POTENTIAL BARRIERS TO INTERNAL ROTATION IN MOLECULES

82. H.EYRING,G.H.STEWART,AND R.P.SMITH,PROC.NATL.ACAD.SCI.U.S.44, 259-260(1958) PRINCIPLE OF MINIMUM BENDING OF LOCALIZED AND DELOCALIZED ORBITALS-ETHANE BARRIER AND RELATED EFFECTS

83. S.GOLDEN,J.PHYS.CHEM.62,74-75(1958) EVALUATION OF THE PARTITION FUNCTION FOR RESTRICTED INTERNAL ROTATION

84. D.R.HERSCHBACH AND L.C.KRISHNER,J.CHEM.PHYS.28,728-729(1958) MICROWAVE SPECTRUM OF CH2DCH=CH2 EQUILIBRIUM CONFORMATION OF PROPYLENE

85. D.R.HERSCHBACH AND J.D.SWALEN,J.CHEM.PHYS.29,761-776(1958) INTERNAL BARRIER OF PROPYLENE OXIDE FROM THE MICROWAVE SPECTRUM II.

86. D.R.LIDE,JR.,J.CHEM.PHYS.29,1426-1427(1958) INTERNAL BARRIER IN ETHANE

87. D.R.LIDE,JR.AND D.E.MANN,J.CHEM.PHYS.28,572-576(1958) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION. III. TRIMETHYLAMINE

88. D.R.LIDE,JR. AND D.E.MANN,J.CHEM.PHYS.29,914-920(1958) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION. IV. ISOBUTANE, TERT-BUTYL FLUORIDE,AND TRIMETHYL PHOSPHINE

89. C.C.LIN,AMER.J.PHYS.26,319-323(1958) ON THE CLASSICAL MECHANICS OF

90. L.PAULING,PROC.NATL.ACAD.SCI.U.S.44,211-216(1958) THE NATURE OF BOND ORBITALS AND THE ORIGIN OF POTENTIAL BARRIERS TO INTERNAL ROTATION IN MOLECULES

91. D.G.BURKHARD AND D.M.DENNISON,J.MOL.SPECTRY. 3,299-334(1959) ROTATION SPECTRUM OF METHYL ALCOHOL

92. W.B.DIXON,SPECTROCHIM.ACTA 15,767(1959) INTERNAL ROTATION BARRIER AND DIPOLE MOMENT OF METHYL NITRATE

93. A.A.EVETT,J.CHEM.PHYS.31,1419-1420(1959) COMPARISON OF EXACT AND APPROXIMATE ENERGY LEVELS FOR A HINDERED ROTATOR

94. G.M.HARRIS AND F.E.HARRIS,J.CHEM.PHYS.31,1450-1453(1959) VALENCE BOND CALCULATION OF THE BARRIER TO INTERNAL ROTATION IN MOLECULES

95. D.R.HERSCHBACH,J.CHEM.PHYS.31,91-108(1959) CALCULATION OF ENERGY LEVELS FOR INTERNAL TORSION AND OVERALL ROTATION. III.

96. P.H.KASAI AND R.J.MYERS,J.CHEM.PHYS.30,1096-1097(1959) MICROWAVE SPECTRUM,STRUCTURE,AND INTERNAL ROTATION OF DIMETHYL ETHER

97. V.W.LAURIE,J.CHEM.PHYS.31,1500-1505(1959) MICROWAVE SPECTRUM AND INTERNAL ROTATION OF ETHYL CYANIDE

98. V.W.LAURIE AND D.R.LIDE,JR.,J.CHEM.PHYS.31,939-943(1959) MICROWAVE SPECTRUM AND INTERNAL ROTATION OF 1-CHLORO-2-BUTYNE

99. D.R.LIDE,JR.,J.CHEM.PHYS.30,37-39(1959) MICROWAVE SPECTRA OF MOLECULES EXHIBITING INTERNAL ROTATION. V.BARRIER HEIGHT IN ETHYL CHLORIDE AND ETHYL BROMIDE

100. C.C.LIN AND J.D.SWALEN,REVS.MOD.PHYS.31,841-892(1959) INTERNAL ROTATION AND MICROWAVE SPECTROSCOPY

101. L.PIERCE,J.CHEM.PHYS.31,547-548(1959) INTERNAL ROTATION IN DOUBLE INTERNAL ROTOR MOLECULES-THE MICROWAVE SPECTRUM OF DIMETHYLSILANE

102. J.D.SWALEN AND C.C.COSTAIN,J.CHEM.PHYS.31,1562-1574(1959) INTERNAL ROTATION IN MOLECULES WITH TWO INTERNAL ROTORS-MICROWAVE SPECTRUM OF ACETONE

103. W.WELTNER,J.CHEM.PHYS.31,264-265(1959) POLYTYPISM AND THE ORIGIN OF THE POTENTIAL BARRIER HINDERING INTERNAL ROTATION IN MOLECULES

104. E.B.WILSON JR.,ADVANCES IN CHEMICAL PHYSICS 2,367-393(1959) THE PROBLEM OF BARRIERS TO INTERNAL ROTATION IN MOLECULES

105. D.G.BURKHARD,J.OPT.SOC.AM.50,1214-1227(1960) INTERNAL ANGULAR MOMENTUM IN HINDERED ROTATION

106. W.L.CLINTON,J.CHEM.PHYS.33,632-633(1960) NOTE ON THE INTERNAL ROTATION PROBLEM

107. M.KARPLUS,J.CHEM.PHYS.33,316-317(1960) NOTE ON THE INTERNAL-ROTATION BARRIER IN ETHANIC COMPOUNDS

108. T.KOJIMA,J.PHYS.SOC.JAPAN 15,284-287(1960) POTENTIAL BARRIER OF PHENOL FROM ITS MICROWAVE SPECTRUM

109. R.J.MYERS AND E.B.WILSON,JR.,J.CHEM.PHYS.33,186-191(1960) APPLICATION OF SYMMETRY PRINCIPLES TO THE ROTATION-INTERNAL TORSION LEVELS OF MOLECULES WITH TWO EQUIVALENT METHYL GROUPS

110. H.D.RUDOLPH,H.DREIZLER,AND W.MAIER,Z.NATURFORSCH 15A,742(1960) MICROWAVE SPECTRUM,STRUCTURE,AND HINDERANCE POTENTIAL OF (CH3)2S

111. H.DREIZLER,Z.NATURFORSCH 16A,477-484(1961) GROUP THEORETICAL CONSIDERATIONS OF THE MICROWAVE SPECTRUM OF MOLECULES CONTAINING TWO METHYL GROUPS WITH HINDERED ROTATION AND WITH DIFFERENT CARBON ISOTOPES

112. H.DREIZLER,Z.NATURFORSCH 16A,1354-1367(1961) GROUP THEORETICAL ANALYSIS OF THE MICROWAVE SPECTRA OF MOLECULES WITH TWO ROTATION-HINDERED TRIGONALLY SYMMETRIC MOLECULE GROUPS

113. H.DREIZLER AND H.D.RUDOLPH,Z.NATURFORSCH 17A.712-732(1961) THE TORSION FINE STRUCTURE IN THE ROTATIONAL SPECTRUM OF DIMETHYLSULFIDE AND THE INTERNAL HINDERANCE POTENTIAL

114. W.G.FATELEY AND F.A.MILLER,SPECTROCHIM.ACTA 17,857-868(1961) TORSIONAL FREQUENCIES IN THE FAR INFRARED-I. MOLECULES WITH A SINGLE METHYL ROTOR

115. M.HAYASHI AND L.PIERCE,J.CHEM.PHYS.35,1148-1149(1961) TABLES FOR THE INTERNAL ROTATION PROBLEM

116. T.KOJIMA,E.L.BREIG,AND C.C.LIN,J.CHEM.PHYS.35,2139-2144(1961) MICROWAVE SPECTRUM AND INTERNAL BARRIER OF METHYL PHOSPHINE

117. W.F.LIBBY,J.CHEM.PHYS.35,1527(1961) ISOTOPE SIZE EFFECT IN VAN DER WAALS RADII AND THE BARRIER TO ROTATION AROUND THE CARBON-CARBON SINGLE BOND

118. L.PIERCE,J.CHEM.PHYS.34,498-506(1961) ENERGY LEVELS FOR INTERNAL AND OVERALL ROTATION OF TWO TOP MOLECULES I. MICROWAVE SPECTRUM OF DIMETHYL SILANE

119. L.PIERCE AND M.HAYASHI,J.CHEM.PHYS.35,479-485(1961) MICROWAVE SPECTRUM,DIPOLE MOMENT,STRUCTURE,AND INTERNAL ROTATION OF DIMETHYL SULFIDE

120. M.L.SAGE,J.CHEM.PHYS.35,142-148(1961) INTERNAL ROTATION OF CIS 2,3 EPOXYBUTANE FROM THE MICROWAVE SPECTRUM

121. W.G.FATELEY AND F.A.MILLER,SPECTROCHIM.ACTA 18,977-993(1962) TORSIONAL FREQUENCIES IN THE FAR INFRARED II. MOLECULES WITH TWO OR THREE METHYL ROTORS

122. E.HIROTA,J.CHEM.PHYS.37,283-291(1962) ROTATIONAL ISOMERISM AND MICROWAVE SPECTROSCOPY I. THE MICROWAVE SPECTRUM OF NORMAL PROPYL FLUORIDE

123. E.HIROTA,J.CHEM.PHYS.37,2918-2920(1962) ROTATIONAL ISOMERISM AND MICROWAVE SPECTROSCOPY II. THE MICROWAVE SPECTRUM OF BUTYRONITRILE

124. B.KIRTMAN,J.CHEM.PHYS.37,2516-2539(1962) INTERACTIONS BETWEEN ORDINARY VIBRATIONS AND HINDERED INTERNAL ROTATION I. ROTATIONAL ENERGIES

125. V.MAGNASCO,NUOVO CIMENTO 24,425-441(1962) AN EMPIRICAL METHOD FOR CALCULATING BARRIERS TO INTERNAL ROTATION IN SIMPLE MOLECULES

126. K.D.MOLLER AND H.G.ANDRESEN,J.CHEM.PHYS.37,1800-1807(1962) THEORY OF TORSION VIBRATIONS OF (CH3)2X-TYPE MOLECULES

127. Y.A.PENTIN AND V.M.TATEVSKII,IZV.AKAD.NAUK SSSR,SER.FIZ.26,1241-1246 (1962) INVESTIGATION OF INTERNAL ROTATION AND CIS-TRANS ISOMERISM OF MOLECULAR STRUCTURE BY SPECTROSCOPIC METHODS

128. C.R.QUADE,TABLES OF INTEGRALS FOR APPLICATION TO THE INTERNAL ROTATION OF CERTAIN ASYMMETRIC INTERNAL ROTORS, DEPARTMENT OF PHYSICS,UNIVERSITY OF OKLAHOMA(1962)

129. R.L.REDINGTON,W.B.OLSEN,AND P.C.CROSS,J.CHEM.PHYS.36,1311-1326(1962) STUDIES OF HYDROGEN PEROXIDE-THE INFRARED SPECTRUM AND THE INTERNAL ROTATION PROBLEM

130. R.A.BEAUDET,J.CHEM.PHYS.38,2548-2552(1963) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION,AND DIPOLE MOMENT OF CIS CROTONONITRILE

131. H.DREIZLER AND R.PETER,J.CHEM.PHYS.39,1132(1963) TABLES FOR THE ANALYSIS OF ROTATIONAL SPECTRA CONTAINING CENTRIFUGAL DISTORTION AND TORSIONAL SPLITTING

132. H.DREIZLER,H.G.SCHIRDEWAHN,AND B.STARK,Z.NATURFORSCH 18A,670-671 (1963) NUMERICAL VALUES OF SOME DISTURBANCE SUMS FOR THE ANALYSIS OF THE TORSION FINE STRUCTURE OF ROTATION SPECTRA

133. W.G.FATELEY AND F.A.MILLER,SPECTROCHIM.ACTA 19,611-628(1963) TORSIONAL FREQUENCIES IN THE FAR INFRARED III. THE FORM OF THE POTENTIAL CURVE FOR HINDERED INTERNAL ROTATION OF A METHYL GROUP

134. D.R.HERSCHBACH,UCRL-10404(1963) BIBLIOGRAPHY FOR HINDERED INTERNAL ROTATION AND MICROWAVE SPECTROSCOPY

135. K.D.MOLLER AND H.G.ANDRESEN,J.CHEM.PHYS.38,17-22(1963) ON THE THEORY OF TORSIONAL VIBRATIONS OF (CH3)3-X TYPE MOLECULES

136. C.R.QUADE AND C.C.LIN,J.CHEM.PHYS.38,540-550(1963) INTERNAL ROTATION IN COMPLETELY ASYMMETRIC MOLECULES I.A GENERAL THEORY AND ANALYSIS OF THE MICROWAVE ROTATIONAL SPECTRUM OF CH2DCOH,CD2HCOH, AND CHOOCH2D

137. O.L.STIEFVATER AND J.SHERIDAN,PROC.CHEM.SOC.1963,368(1963) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION IN ACETYL ACETYLENE

138. B.KIRTMAN,J.CHEM.PHYS.41,775-788(1964) INTERACTIONS BETWEEN ORDINARY VIBRATIONS AND HINDERED INTERNAL ROTATION. II. THEORY OF INTERNAL ROTATION FINE STRUCTURE IN SOME PERPENDICULAR BANDS OF ETHANE-TYPE MOLECULES

139. B.KIRTMAN,J.CHEM.PHYS.41,3262(1964) ELECTRON DISTRIBUTIONS

INVOLVED IN BARRIERS TO INTERNAL ROTATION

140. V.W.LAURIE,J.MOL.SPECTRY.13,283-287(1964) INTERNAL ROTATION AND CORIOLIS COUPLING IN SYMMETRIC TOP MOLECULES

141. I.A.MUKHTAROV,OPTIKA I SPEKTROSKOPIYA 16,910(1964) DETERMINATION THE FREQUENCY OF TORSIONAL VIBRATION FOR TRIFLUOROETHYLENE FROM THE MICROWAVE SPECTRUM

142. S.NAKAGAWA,T.KOJIMA,S.TAKAHASHI,AND C.C.LIN,J.MOL.SPECTRY 14,201 (1964) MICROWAVE SPECTRUM AND INTERNAL BARRIER OF METHYLTHIOCYANATE

143. D.STELMAN,J.CHEM.PHYS.41,2111-2115(1964) DENOMINATOR CORRECTION TO THE VAN VLECK TRANSFORMATION-INTERNAL ROTATION PROBLEM

144. J.T.YARDLEY,J.HINZE,AND R.F.CURL,JR.,J.CHEM.PHYS.41,2562-2563(1964) EQUILIBRIUM CONFORMATION OF N-METHYLENE-METHYLAMINE FROM MICROWAVE DATA

145. R.C.WOODS III. MOLECULAR SPECTROSCOPY SYMPOSIUM,OHIO STATE UNIV. (1964) A COMPUTER CALCULATION OF INTERNAL ROTATION SPLITTINGS APPLIED TO THE MICROWAVE SPECTRUM OF FLUORAL

146. R.E.WYATT AND R.G.PARR,J.CHEM.PHYS.41,3262-3263(1964) ORIGIN OF THE BARRIER HINDERING INTERNAL ROTATION IN ETHANE

147. E.HIROTA,J.CHEM.PHYS.42,2071-2089(1965) ROTATIONAL ISOMERISM AND MICROWAVE SPECTROSCOPY.III. THE MICROWAVE SPECTRUM OF 3-FLUOROPROPENE

148. R.H.HUNT,R.A.LEACOCK,C.W.PETERS AND K.T.HECHT, J.CHEM.PHYS. 42, 1931-1946(1965) INTERNAL-ROTATION IN HYDROGEN PEROXIDE. THE FAR-INFRARED SPECTRUM AND THE DETERMINATION OF THE HINDERING POTENTIAL

149. R.A.SCOTT AND H.A.SCHERAGA,J.CHEM.PHYS.42,2209-2215(1965) METHOD FOR CALCULATING INTERNAL ROTATION BARRIERS

150. M.L.UNLAND,V.WEISS,AND W.H.FLYGARE,J.CHEM.PHYS.42,2138-2149(1965) BARRIER STUDIES IN THE HALOPROPENES. I.THE MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION,QUADRUPOLE COUPLING CONSTANTS, AND MICROWAVE DOUBLE-RESONANCE SPECTRA OF 2-CHLOROPROPENE

Section IX. INVERSION

Early microwave studies of ammonia[8-12, 14-17] led to an immediate interest in the inversion problem. A number of twofold, potential functions[2-6, 13, 21, 52, 53] were applied to ammonia to calculate the barrier height and inversion splittings. These functions have also been adapted to inversion in asymmetric rotors.[20, 47, 56, 58, 62] Recent interest has been directed toward near-planar molecules,[40, 44, 50, 61] and has led to the development of matrix elements in both the harmonic oscillator and quartic oscillator representations.[54, 55] These efforts have been aided by far-infrared vibrational data.[43]

The J-dependence of the inversion doubling has been treated with expressions of linear[20, 47, 59] and exponential dependence.[18, 59] Interactions with other molecular vibrations have been of considerable interest in ammonia[29, 53] and methylamine.[24, 34, 35] The possibility of two coupled inversion-type motions was encountered in hydrazine.[47, 57]

1. F.HUND,Z.PHYSIK 43,805-826(1927) SIGNIFICANCE OF MOLECULAR SPECTRA. PART III. NOTES ON THE OSCILLATION AND ROTATION SPECTRA OF MOLECULES WITH MORE THAN TWO NUCLEI

2. P.M.MORSE AND E.C.G.STUCKELBERG,HELV.PHYS.ACTA 4,337-354(1931) SOLUTION OF THE EIGENVALUE PROBLEM FOR A POTENTIAL FIELD WITH TWO MINIMA

3. D.M.DENNISON AND G.E.UHLENBECK,PHYS.REV.41,313-321(1932) THE TWO-MINIMA PROBLEM AND THE AMMONIA MOLECULE

4. N.ROSEN AND P.M.MORSE,PHYS.REV.42,210-217(1932) ON THE VIBRATIONS OF POLYATOMIC MOLECULES

5. M.F.MANNING,J.CHEM.PHYS.3,136-138(1935) ENERGY LEVELS OF A SYMMETRICAL DOUBLE MINIMA PROBLEM WITH APPLICATIONS TO THE NH3 AND ND3 MOLECULES

6. F.T.WALL AND G.GLOCKER,J.CHEM.PHYS.5,314-315(1937) THE DOUBLE MINIMUM PROBLEM APPLIED TO THE AMMONIA MOLECULES

7. H-Y SHENG,F.F.BARKER, AND D.M.DENNISON,PHYS.REV.60,786-794(1941) FURTHER RESOLUTION OF TWO PARALLEL BANDS OF AMMONIA AND THE INTERACTION BETWEEN VIBRATION AND ROTATION

8. B.BLEANEY AND R.P.PENROSE,PHYS.REV.70,775-776(1946) THE INVERSION SPECTRUM OF AMMONIA

9. W.E.GOOD,PHYS.REV.70,213-218(1946) THE INVERSION SPECTRUM OF AMMONIA

10. B.BLEANEY AND R.P.PENROSE,PROC.ROY.SOC.A189,358-371(1947) THE INVERSION SPECTRUM OF AMMONIA AT CENTIMETER WAVE-LENGTHS

11. H.H.NIELSEN AND D.M.DENNISON,PHYS.REV.72,1101-1108(1947) ANOMALOUS VALUES OF CERTAIN OF THE FINE STRUCTURE LINES IN THE AMMONIA MICROWAVE SPECTRUM

12. M.W.P.STRANDBERG,R.KYHL,T.WENTINK,AND R.E.HILLGER,PHYS.REV.71,326 (1947) INVERSION SPECTRUM OF AMMONIA ERRATA-PHYS.REV.71,639(1947)

13. R.R.NEWTON AND L.H.THOMAS,J.CHEM.PHYS.16,310-323(1948) INTERNAL MOLECULAR MOTIONS OF LARGE AMPLITUDE ILLUSTRATED BY THE SYMMETRICAL VIBRATION OF AMMONIA

14. J.W.SIMMONS AND W.GORDY,PHYS.REV.73,713-718(1948) STRUCTURE OF THE INVERSION SPECTRUM OF AMMONIA

15. N.CARRARA,P.LOMBARDINI,R.CINI,AND L.SACCONI,NUOVO CIMENTO 6,552-558 (1949) MOLECULAR SPECTROSCOPY. THE INVERSION SPECTRUM OF AMMONIA

16. A.H.SHARBAUGH,T.C.MADISON,AND J.K.BRAGG,PHYS.REV.76,1529(1949) INVERSION SPECTRUM OF AMMONIA

17. M.TOMASSINI,NUOVO CIMENTO 7,1-11(1950) THE INVERSION SPECTRUM OF AMMONIA

18. C.C.COSTAIN,PHYS.REV.82,108(1951) AN EMPIRICAL FORMULA FOR THE MICROWAVE SPECTRUM OF AMMONIA

19. R.G.NUCKOLLS,L.J.RUEGER, AND H.LYONS,PHYS.REV.83,880-881(1951) MEASUREMENT OF THE MICROWAVE INVERSION SPECTRUM OF ND3

20. M.T.WEISS AND M.W.P.STRANDBERG,PHYS.REV.83,567-575(1951) THE MICROWAVE SPECTRA OF THE DEUTERO-AMMONIAS

21. C.C.COSTAIN AND G.B.B.M.SUTHERLAND,PHYS.CHEM.56,321-324(1952) A METHOD OF DETERMINING THE POTENTIAL BARRIERS RESTRICTING INVERSION IN AMMONIA,PHOSPHINE,AND ARSINE FROM VIBRATIONAL FORCE CONSTANTS

22. T.NISHIKAWA AND K.SHIMODA,J.PHYS.SOC.JAPAN 8,426(1953) NEW LINES OF THE INVERSION SPECTRUM OF AMMONIA

23. G.W.RATHJENS,JR.,N.K.FREEMAN,W.D.GWINN,AND K.S.PITZER,J.AM.CHEM.SOC. 75,5634-5642(1953) INFRARED ABSORPTION SPECTRA,STRUCTURE AND THERMODYNAMIC PROPERTIES OF CYCLOBUTANE

24. K.SHIMODA,T.NISHIKAWA,AND T.ITOH,J.CHEM.PHYS.22,1456(1954) MICROWAVE INVESTIGATION OF HINDERED ROTATION AND INVERSION OF METHYLAMINE

25. J.FERNANDEZ,R.J.MYERS,AND W.D.GWINN,J.CHEM.PHYS.23,758-759(1955) MICROWAVE SPECTRUM AND PLANARITY OF THE RING OF TRIMETHYLENE OXIDE

26. D.KIVELSON AND D.R.LIDE,JR.,PHYS.REV.99,667(1955) INTERNAL MOTION IN METHYLAMINE

27. T.NISHIKAWA AND K.SHIMODA,J.PHYS.SOC.JAPAN 10,89-92(1955) INVERSION SPECTRUM OF AMMONIA

28. K.SHIMODA,T.NISHIKAWA,AND T.ITOH,PHYS.REV.98,1160 (1955) MICROWAVE SPECTRUM OF METHYLAMINE

29. W.S.BENEDICT AND E.K.PLYLER,J.CHEM.PHYS.24,904(1956) INTERACTION OF STRETCHING VIBRATIONS AND INVERSION IN AMMONIA

30. J.BONANOMI AND J.HERRMANN,HELV.PHYS.ACTA 29,451-452(1956) DETERMINATION OF THE INVERSION FREQUENCY OF AMMONIA

31. T.ITOH,J.PHYS.SOC.JAPAN 11,264-271(1956) MOLECULAR STRUCTURE OF METHYLAMINE

32. G.ERLANDSSON AND W.GORDY,PHYS.REV.106,513-515(1957) SUBMILLIMETER WAVE SPECTROSCOPY,ROTATION-INVERSION TRANSITIONS IN ND3

33. H.G.FITZKY,R.HONERJAGER,AND W.WILKE,Z.PHYSIK 149,471-479(1957) INVERSION SPECTRUM OF AMMONIA

34. D.KIVELSON AND D.R.LIDE,JR.,J.CHEM.PHYS.27,353-360(1957) THEORY OF INTERNAL MOTIONS AND APPLICATION TO CD3ND2

35. D.R.LIDE,JR.,J.CHEM.PHYS.27,343-352(1957) STRUCTURE OF THE METHYL AMINE MOLECULE I. MICROWAVE SPECTRUM OF CD3ND2

36. G.HERRMANN,J.CHEM.PHYS.29,875-879(1958) GROUND STATE INVERSION SPECTRUM OF N(14)D3

37. E.HEILBRONNER,H.RUTISHAUSER,AND F.GERSON,HELV.CHIM.ACTA 42, 2304-2314(1959) EIGENVALUES,EIGENFUNCTIONS,AND THERMODYNAMIC FUNCTIONS FOR THE 6-FOLD POTENTIAL OF A LINEAR OSCILLATOR

38. J.K.TYLER,L.F.THOMAS,AND J.SHERIDAN,PROC.CHEM.SOC.1959,155-156(1959) MICROWAVE SPECTRUM AND STRUCTURE OF CYANAMIDE

39. A.A.VUYLSTEKE,AM.J.PHYS.27,554-565(1959) MASER STATES IN AMMONIA-INVERSION

40. S.I.CHAN,J.ZINN,J.FERNANDEZ,AND W.D.GWINN,J.CHEM.PHYS.33,1643-1655 (1960) TRIMETHYLENE OXIDE I. MICROWAVE SPECTRUM,DIPOLE MOMENT, AND DOUBLE MINIMUM VIBRATION

41. S.I.CHAN,J.ZINN,AND W.D.GWINN,J.CHEM.PHYS.33,295-296(1960) DOUBLE MINIMUM VIBRATION IN TRIMETHYLENE OXIDE

42. C.C.COSTAIN AND J.M.DOWLING,J.CHEM.PHYS.32,158-165(1960) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF FORMAMIDE

43. A.DANTI,W.J.LAFFERTY,AND R.C.LORD,J.CHEM.PHYS.33,294-295(1960) FAR INFRARED SPECTRUM OF TRIMETHYLENE OXIDE

44. S.I.CHAN,J.ZINN,AND W.D.GWINN,J.CHEM.PHYS.34,1319-1329(1961) TRIMETHYLENE OXIDE II. STRUCTURE,VIBRATION-ROTATION INTERACTION, AND ORIGIN OF POTENTIAL FUNCTION FOR RING PUCKERING MOTION

45. F.GERSON,HELV.CHIM.ACTA 44,471-476(1961) THE ONE-DIMENSIONAL OSCILLATOR 6-FOLD POTENTIAL AS A BASIS FOR A SYMMETRICAL DOUBLE MINIMUM PROBLEM

46. G.P.SHIPULO,OPTICS AND SPECTROSCOPY 10,288(1961) ROTATIONAL SPECTRUM OF CYANAMIDE

47. T.KASUYA,SCI.PAPERS INST.PHYS.AND CHEM.RESEARCH(TOKYO,JAPAN) 56, 1-39(1962) MICROWAVE STUDIES OF INTERNAL MOTIONS OF HYDRAZINE MOLECULE

48. D.R.LIDE,JR.,J.MOL.SPECTRY.8,142-152(1962) VIBRATION-ROTATION INTERACTIONS IN CYANAMIDE-THE QUESTION OF PLANARITY OF AMIDES

49. D.J.MILLEN,G.TOPPING,AND D.R.LIDE,JR.,J.MOL.SPECTRY.8,153-163(1962) MICROWAVE SPECTRUM AND NONPLANARITY OF CYANAMIDE

50. G.W.RATHJENS,J.CHEM.PHYS.36,2401-2406(1962) MICROWAVE INVESTIGATION OF CYCLOPENTENE

51. R.L.SOMORJAI AND D.F.HORNIG,J.CHEM.PHYS.36,1980-1987(1962) DOUBLE-MINIMUM POTENTIALS IN HYDROGEN-BONDED SOLIDS

52. J.D.SWALEN AND J.A.IBERS,J.CHEM.PHYS.36,1914-1918(1962) POTENTIAL FUNCTION FOR THE INVERSION OF AMMONIA

53. W.T.WEEKS,K.T.HECHT,AND D.M.DENNISON,J.MOL.SPECTRY.8,30-57(1962) INVERSION-VIBRATION AND INVERSION-ROTATION INTERACTIONS IN THE AMMONIA MOLECULE

54. S.I.CHAN AND D.STELMAN,J.MOL.SPECTRY.10,278-299(1963) SOME ENERGY

LEVELS AND MATRIX ELEMENTS OF THE QUARTIC OSCILLATOR

55. S.I.CHAN AND D.STELMAN,J.CHEM.PHYS.39,545-551(1963) OSCILLATORS PERTURBED BY GAUSSIAN BARRIERS

56. W.H.FLETCHER AND F.B.BROWN,J.CHEM.PHYS.39,2478-2490(1963) VIBRATIONAL SPECTRA AND THE INVERSION PHENOMENON IN CYANAMIDE AND DEUTERATED CYANAMIDE

57. T.KASUYA AND T.KOJIMA,J.PHYS.SOC.JAPAN 18,364-368(1963) INTERNAL MOTIONS OF HYDRAZINE

58. V.W.LAURIE AND J.WOLLRAB,BULL.AM.PHYS.SOC.327 (1963) MICROWAVE SPECTRUM AND INVERSION OF DIMETHYLAMINE

59. M.LICHTENSTEIN,J.J.GALLAGHER,AND V.E.DERR,J.MOL.SPECTRY.12,87-97 (1964) SPECTROSCOPIC INVESTIGATIONS OF THE DEUTERO-AMMONIAS IN THE MILLIMETER REGION

60. C.B.MOORE AND G.C.PIMENTEL,J.CHEM.PHYS.40,1529-1534(1964) OUT-OF-PLANE CH2 BENDING POTENTIAL FUNCTIONS OF DIAZOMETHANE,KETENE, AND RELATED MOLECULES

61. S.S.BUTCHER AND C.C.COSTAIN,J.MOL.SPECTRY 15,40-50(1965) VIBRATION-ROTATION INTERACTION IN THE MICROWAVE SPECTRUM OF CYCLOPENTENE

62. W.M.TOLLES AND W.D.GWINN,J.CHEM.PHYS.42,2253-2254(1965) QUADRUPOLE COUPLING CONSTANTS AND LOWER LIMIT TO THE BARRIER FOR INVERSION IN ETHYLENIMINE

Section X. STARK EFFECT

1. R.DE L.KRONIG,PROC.NATL.ACAD.SCI.12,488-493(1926) THE DIELECTRIC CONSTANT OF DIATOMIC DIPOLE-GASES ON THE NEW QUANTUM MECHANICS

2. R.DE L.KRONIG,PROC.NATL.ACAD.SCI.12,608-612(1926) THE DIELECTRIC CONSTANT OF SYMMETRICAL POLYATOMIC DIPOLE-GASES ON THE NEW QUANTUM MECHANICS

3. P.DEBYE,POLAR MOLECULES,CHEMICAL CATALOG COMPANY INC.NEW YORK(1929)

4. F.BROUWER,DISSERTATION,AMSTERDAM(1930)

5. W.G.PENNEY,PHIL.MAG.11,602-609(1931) THE STARK EFFECT IN BAND SPECTRA

6. R.P.BELL AND I.E.COOP,TRANS.FARADAY SOC.34,1209-1214(1938) THE DIPOLE MOMENTS OF HYDROGEN AND DEUTERIUM CHLORIDES

7. T.W.DAKIN,W.E.GOOD,AND D.K.COLES,PHYS.REV.70,560(1946) RESOLUTION OF A ROTATIONAL LINE OF THE OCS MOLECULE AND ITS STARK EFFECT

8. D.K.COLES AND W.E.GOOD,PHYS.REV.72,157 (1947) STARK AND ZEEMAN EFFECTS IN MICROWAVE SPECTROSCOPY

9. B.P.DAILEY,PHYS.REV.72,84-85(1947) FIRST ORDER STARK EFFECT IN THE MICROWAVE SPECTRUM OF METHYL ALCOHOL

10. H.K.HUGHES,PHYS.REV.72,614-623(1947) THE ELECTRIC RESONANCE METHOD RADIOFREQUENCY SPECTROSCOPY. THE MOMENT OF INERTIA AND ELECTRIC DIPOLE MOMENT OF CSF

11. J.M.JAUCH,PHYS.REV.72,715-723(1947) THE HYPERFINE STRUCTURE AND THE STARK EFFECT OF THE AMMONIA INVERSION SPECTRUM

12. W.V.SMITH,PHYS.REV.71,126-127(1947) DETERMINATION OF NUCLEAR SPIN FROM THE STARK EFFECT OF MICROWAVE ROTATIONAL SPECTRA

13. C.H.TOWNES AND F.R.MERRITT,PHYS.REV.72,1266-1267(1947) STARK EFFECT IN HIGH FREQUENCY FIELDS

14. D.K.COLES,PHYS.REV.74,1194-1195(1948) MICROWAVE ABSORPTION LINE FREQUENCIES OF METHYL ALCOHOL AND THEIR STARK EFFECT

15. U.FANO,J.RESEARCH NATL.BUR.STANDARDS 40,215-223(1948) ELECTRIC QUADRUPOLE COUPLING OF THE NUCLEAR SPIN WITH THE ROTATION OF A POLAR DIATOMIC MOLECULE IN AN EXTERNAL ELECTRIC FIELD

16. S.GOLDEN,T.WENTINK,R.HILLGER,AND M.W.P.STRANDBERG, PHYS.REV.73, 92-93(1948) STARK SPECTRUM OF H2O

17. S.GOLDEN AND E.B.WILSON,JR.,J.CHEM.PHYS.16,669-685(1948) THE STARK EFFECT FOR A RIGID ASYMMETRIC ROTOR

18. W.A.NIERENBERG,I.I.RABI,AND M.SLOTNICK ,PHYS.REV.73,1430-1433(1948) A NOTE ON THE STARK EFFECT IN DIATOMIC MOLECULES

19. W.A.NIERENBERG AND M.SLOTNICK,PHYS.REV.74,1246(1948) A NOTE ON

20. M.W.P.STRANDBERG,T.WENTINK,R.E.HILLGER,G.H.WANNIER,AND M.L.DEUTESCH, PHYS.REV.73,188(1948) STARK SPECTRUM OF HDO

21. L.G.WESSON,TABLES OF ELECTRIC DIPOLE MOMENTS, TECHNOLOGY PRESS, CAMBRIDGE,MASS.(1948)

22. H.K.HUGHES,PHYS.REV.76,1675-1677(1949) THE ROTATIONAL STARK SPECTRUM OF LINEAR MOLECULES

23. R.KARPLUS AND A.H.SHARBAUGH,PHYS.REV.75,889-890(1949) SECOND-ORDER STARK EFFECT OF METHYL CHLORIDE ERRATA- PHYS.REV.75, 1449(1949)

24. A.LENARD,TABLES FOR CALCULATION OF STARK AND ZEEMAN EFFECTS.,DEPT. OF PHYSICS,STATE UNIV. OF IOWA(1949) (OUT OF PRINT)

25. W.LOW AND C.H.TOWNES,PHYS.REV.76,1295-1299(1949) MOLECULAR DIPOLE MOMENTS AND STARK EFFECTS. I.STARK EFFECTS ON SYMMETRIC TOP MOLECULES WITH NUCLEAR QUADRUPOLE COUPLING

26. J.BARRIOL,J.PHYS.RADIUM 11,62-66(1950) THE STUDY OF THE STARK EFFECT FOR THE CASE OF A ROTATOR POSSESSING A PERMANENT DIPOLE

27. F.COESTER,PHYS.REV.77,454-462(1950) STARK-ZEEMAN EFFECTS ON SYMMETRIC TOP MOLECULES WITH NUCLEAR QUADRUPOLE COUPLING

28. R.G.SHULMAN,B.P.DAILEY, AND C.H.TOWNES,PHYS.REV.78,145-148(1950) MOLECULAR DIPOLE MOMENTS AND STARK EFFECTS. III. DIPOLE MOMENT DETERMINATIONS

29. R.G.SHULMAN AND C.H.TOWNES,PHYS.REV.77,500-506(1950) MOLECULAR DIPOLE MOMENTS AND STARK EFFECTS. II. STARK EFFECTS IN OCS

30. D.K.COLES,W.E.GOOD,J.K.BRAGG, AND A.H.SHARBAUGH,PHYS.REV.82,877-878 (1951) THE STARK EFFECT OF THE AMMONIA INVERSION SPECTRUM

31. D.W.MAGNUSON,J.CHEM.PHYS.19,1071(1951) DETERMINATION OF THE TWO-DIPOLE MOMENT COMPONENTS IN NITROSYL FLUORIDE

32. J.N.SHOOLERY AND A.H.SHARBAUGH,PHYS.REV.82,95(1951) SOME MOLECULAR DIPOLE MOMENTS DETERMINED BY MICROWAVE SPECTROSCOPY

33. S.N.GHOSH,R.TRAMBARULO, AND W.GORDY,J.CHEM.PHYS.21,308-310(1953) ELECTRIC DIPOLE MOMENTS OF SEVERAL MOLECULES FROM THE STARK EFFECT

34. M.MIZUSHIMA,J.CHEM.PHYS.21,539-541(1953) THEORY OF THE STARK EFFECT OF ASYMMETRIC ROTATOR WITH HYPERFINE STRUCTURE

35. S.H.AUTLER AND C.H.TOWNES,PHYS.REV.100,703-722(1955) STARK EFFECT IN RAPIDLY VARYING FIELDS

36. C.C.LIN,BULL.AM.PHYS.SOC.(2)1,13(1956) NEW METHOD FOR THE CALCULATION OF STARK EFFECT IN MICROWAVE SPECTRA

37. G.BIRNBAUM,J.CHEM.PHYS.27,360-368(1957) NON-RESONANT ABSORPTION OF SYMMETRIC TOP MOLECULES. SHAPE OF THE NON-RESONANT SPECTRA ERRATA- J.CHEM.PHYS.28,992(1958)

38. D.KIVELSON,J.CHEM.PHYS.26,215-216(1957) THEORY OF INTERNAL OVERALL-ROTATIONAL INTERACTIONS. IV. STARK EFFECT IN NON-RIGID INTERNAL ROTORS

39. S.A.MARSHALL AND J.WEBER,PHYS.REV.105,1502-1506(1957) MICROWAVE STARK EFFECT MEASUREMENT OF THE DIPOLE MOMENT AND POLARIZABILITY OF CARBONYL SULFIDE

40. A.A.MARYOTT AND S.J.KRYDER,J.CHEM.PHYS.27,1221-1222(1957) DIPOLE MOMENT OF PERCHLORYL FLUORIDE

41. M.PETER AND M.W.P.STRANDBERG,J.CHEM.PHYS.26,1657-1659(1957) HIGH FIELD STARK EFFECT IN LINEAR ROTORS

42. C.A.BURRUS,J.CHEM.PHYS.28,427-429(1958) STARK EFFECT FROM 1.1 TO 2.6 MILLIMETERS WAVELENGTH-PH3,PD3,DI,AND CO

43. C.A.BURRUS AND J.D.GRAYBEAL,PHYS.REV.109,1553-1556(1958) STARK EFFECT AT 2.0 AND 1.2 MILLIMETERS - NITRIC OXIDE

44. E.A.HALEVI,TRANS.FARADAY SOC.54,1441-1446(1958) POLARITY DIFFERENCES BETWEEN DEUTERATED AND NORMAL MOLECULES

45. M.MIZUSHIMA,PHYS.REV.109,1557-1559(1958) THEORY OF THE STARK EFFECT OF THE NO MOLECULE

46. E.L.BEESON,J.Q.WILLIAMS,AND T.L.WEATHERLY,BULL.AM.PHYS.SOC.4,291 (1959) STARK EFFECT FOR NEAR-DEGENERATE ROTATIONAL LEVELS OF NOCL

47. C.A.BURRUS,J.CHEM.PHYS.31,1270-1272(1959) STARK EFFECT AT 0.93-, 1.18-,AND 1.5 MILLIMETER WAVE LENGTH-DCL,DBR,AND DI

48. H.DREIZLER AND H.D.RUDOLPH,Z.NATURFORSCH 14A,758(1959) STARK EFFECT OF THE MICROWAVE ABSORPTION LINE OF METHANOL AT 19967.3 MC

49. D.F.EAGLE,T.L.WEATHERLY,AND J.Q.WILLIAMS,BULL.AM.PHYS.SOC.4,291(1959) THEORY OF THE STARK EFFECT AND HYPERFINE STRUCTURE FOR NEAR-DEGENERATE ENERGY LEVELS OF AN ASYMMETRIC ROTOR

50. D.F.EAGLE,T.L.WEATHERLY,AND Q.WILLIAMS,J.CHEM.PHYS.30,603-604(1959) STARK EFFECT IN THE MICROWAVE SPECTRUM OF NITROSYL BROMIDE

51. A.A.MARYOTT AND S.J.KRYDER,J.CHEM.PHYS.31,617-621(1959) NON-RESONANT MICROWAVE ABSORPTION AND ELECTRIC DIPOLE MOMENT OF NO IN THE GASEOUS STATE

52. E.B.WILSON,JR.,J.PHYS.CHEM.63,1339-1340(1959) CONDITIONS REQUIRED FOR NON-RESONANT ABSORPTION IN ASYMMETRIC ROTOR MOLECULES

53. B.N.BHATTACHARYA AND W.GORDY,PHYS.REV.119,144-149(1960) OBSERVATION OF σ STARK COMPONENTS IN MICROWAVE SPECTROSCOPY-PRECISION MEASUREMENTS ON HCN

54. H.DREIZLER AND H.D.RUDOLPH,Z.NATURFORSCH 15A,1013-1014(1960) A SPECIAL STARK EFFECT OF A K DOUBLET IN THE MICROWAVE SPECTRUM OF METHANOL

55. P.FAVERO AND J.G.BAKER,NUOVO CIMENTO 17,734-739(1960) ANOMALOUS

STARK EFFECTS IN THE MILLIMETER WAVE SPECTRUM OF FORMYL FLUORIDE

56. K.KONDO AND T.OKA,J.PHYS.SOC.JAPAN 15,307-314(1960) STARK-ZEEMAN EFFECTS ON ASYMMETRIC TOP MOLECULES. HCHO

57. G.H.KWEI AND D.R.HERSCHBACH ,J.CHEM.PHYS.32,1270-1271(1960) STARK EFFECT AND DIPOLE MOMENT OF CH3CHF2

58. D.R.LIDE,JR.,J.CHEM.PHYS.33,1519-1522(1960) STRUCTURE OF ISOBUTANE MOLECULE-CHANGE OF DIPOLE MOMENT ON ISOTOPIC SUBSTITUTION

59. H.B.THOMPSON,J.PHYS.CHEM.64,280-281(1960) THE ELECTRIC MOMENTS OF MOLECULES WITH SYMMETRIC ROTATIONAL BARRIERS

60. L.WHARTON,L.P.GOLD,AND W.KLEMPERER,J.CHEM.PHYS.33,1255(1960) DIPOLE MOMENT OF LITHIUM HYDRIDE

61. R.T.MEYER AND R.J.MYERS,J.CHEM.PHYS.34,1074-1075(1961) DIPOLE MOMENT OF THE OH RADICAL FROM THE STARK EFFECT OF ITS MICROWAVE SPECTRUM

62. H.A.DIJKERMAN AND A.DYMANUS,PHYSICA 28,977-992(1962) σ -STARK EFFECT OF ROTATIONAL TRANSITIONS. II. MICROWAVE SPECTRUM OF METHYL ALCOHOL

63. H.KIM,R.KELLER,AND W.D.GWINN,J.CHEM.PHYS.37,2748-2750(1962) DIPOLE MOMENT OF FORMIC ACID,HCOOH,HCOOD

64. W.M.TOLLES,J.L.KINSEY,R.F.CURL,AND R.F.HEIDELBERG,J.CHEM.PHYS.37, 927-930(1962) MICROWAVE SPECTRUM OF CHLORINE DIOXIDE V. STARK AND ZEEMAN EFFECTS

65. D.M.LARKIN AND W.GORDY,J.CHEM.PHYS.38,2329-2333(1963) STARK EFFECT AND DIPOLE MOMENT OF METHYL FLUORIDE

66. J.S.MUENTER AND V.W.LAURIE,MOLECULAR SPECTROSCOPY SYMPOSIUM,OHIO STATE UNIV.(1964) ISOTOPE EFFECTS ON MOLECULAR DIPOLE MOMENTS. MICROWAVE SPECTRUM OF MONODEUTEROACETYLENE

67. K.R.LINDFORS AND C.D.CORNWELL,J.CHEM.PHYS.42,149-155(1965) RATE-OF-GROWTH TECHNIQUE FOR THE MEASUREMENT OF MOLECULAR DIPOLE MOMENTS FROM MICROWAVE SPECTRA AT WEAK MODULATION FIELDS

Section XI. ELECTRONIC AND MAGNETIC EFFECTS (ZEEMAN EFFECT)

1. E.L.HILL,PHYS.REV.34,1507-1516(1929) ON THE ZEEMAN EFFECT IN DOUBLET BAND SPECTRA

2. J.H.VAN VLECK,PHYS.REV.33,467-506(1929) ON σ -TYPE DOUBLING AND ELECTRON SPIN IN THE SPECTRA OF DIATOMIC MOLECULES

3. R.S.MULLIKEN AND A.CHRISTY,PHYS.REV.38,87-119(1931) Λ -TYPE DOUBLING AND ELECTRON CONFIGURATIONS IN DIATOMIC MOLECULES

4. F.H.CRAWFORD,REVS.MOD.PHYS.6,90-117(1934) ZEEMAN EFFECT IN DIATOMIC MOLECULAR SPECTRA

5. R.RENNER,Z.PHYSIK 92,172-193(1934) INTERACTION OF ELECTRONIC AND NUCLEAR MOTIONS IN TRIATOMIC ROD-SHAPED MOLECULES

6. R.SCHMID,A.BUDO,AND J.ZEMPLEN,Z.PHYSIK 103,250-262(1936) ZEEMAN EFFECT OF ATMOSPHERIC OXYGEN BANDS

7. H.M.FOLEY,PHYS.REV.72,504-505(1947) SECOND-ORDER MAGNETIC PERTURBATIONS IN NUCLEAR QUADRUPOLE SPECTRA AND THE PSEUDO-QUADRUPOLE EFFECT IN DIATOMIC MOLECULES

8. C.K.JEN,PHYS.REV.72,986(1947) MICROWAVE SPECTRA AND ZEEMAN EFFECT IN A RESONANT CAVITY ABSORPTION CELL

9. R.S.HENDERSON AND J.H.VAN VLECK,PHYS.REV.74,106-107(1948) COUPLING OF ELECTRON SPINS IN ROTATING POLYATOMIC MOLECULES

10. J.M.JAUCH,PHYS.REV.74,1262 (1948) SPIN -ORBIT EFFECT IN THE HYPERFINE STRUCTURE OF THE AMMONIA INVERSION SPECTRUM

11. C.K.JEN,PHYS.REV.74,1396-1406(1948) THE ZEEMAN EFFECT IN MICROWAVE MOLECULAR SPECTRA

12. G.C.WICK,PHYS.REV.73,51-57(1948) ON THE MAGNETIC FIELD OF A ROTATING MOLECULE

13. R.BERINGER AND J.G.CASTLE,JR.,PHYS.REV.75,1963(1949) MICROWAVE MAGNETIC RESONANCE ABSORPTION IN OXYGEN

14. R.BERINGER AND J.G.CASTLE,JR. PHYS.REV.76,868(1949) MICROWAVE MAGNETIC RESONANCE ABSORPTION IN NITRIC OXIDE

15. W.GORDY,O.R.GILLIAM,AND R.LIVINGSTON,PHYS.REV.76,443-444(1949) NUCLEAR MAGNETIC MOMENTS FROM MICROWAVE SPECTRA-I(127) AND I(129)

16. C.K.JEN,PHYS.REV.76,471 (1949) ROTATIONAL MAGNETIC MOMENTS FOR H2O AND HDO

17. R.BERINGER AND J.G.CASTLE,JR.,PHYS.REV.78,581-586(1950) MAGNETIC RESONANCE ABSORPTION IN NITRIC OXIDE

18. J.H.BURKHALTER,R.S.ANDERSON,W.V.SMITH,AND W.GORDY,PHYS.REV.79,651-655 (1950) THE FINE STRUCTURE OF THE MICROWAVE ABSORPTION SPECTRUM OF OXYGEN

19. J.G.CASTLE,JR., AND R.BERINGER,PHYS.REV.80,114-115(1950) MICROWAVE

MAGNETIC RESONANCE ABSORPTION IN NITROGEN DIOXIDE

20. A.F.HENRY,PHYS.REV.80,396-401(1950) THE ZEEMAN EFFECT IN OXYGEN

21. A.F.HENRY,PHYS.REV.80,549-552(1950) HYPERFINE STRUCTURE OF ZEEMAN LEVELS IN NITRIC OXIDE

22. H.MARGENAU AND A.HENRY,PHYS.REV.78,587-592(1950) THEORY OF MAGNETIC RESONANCE IN NITRIC OXIDE

23. K.B.MCAFEE,JR.,PHYS.REV.78,340 (1950) MAGNETIC ELECTRON SPIN-NUCLEAR SPIN INTERACTION IN THE ROTATIONAL SPECTRUM OF NO2

24. N.F.RAMSEY,PHYS.REV.78,699-703(1950) MAGNETIC SHIELDING OF NUCLEI IN MOLECULES

25. R.S.ANDERSON,C.M.JOHNSON,AND W.GORDY,PHYS.REV.83,1061-1062(1951) RESONANT ABSORPTION OF OXYGEN AT 2.5-MILLIMETER WAVELENGTH

26. W.E.GOOD,D.K.COLES,G.R.GUNTHER-MOHR,A.L.SCHAWLOW, AND C.H.TOWNES, PHYS.REV.83,880 (1951) A NEW TYPE OF HYPERFINE STRUCTURE IN THE NH3 MICROWAVE SPECTRUM

27. C.K.JEN,PHYS.REV. 81,197-203(1951) ROTATIONAL MAGNETIC MOMENTS IN POLYATOMIC MOLECULES

28. K.SHIMODA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 6,512-516(1951) THE HYPERFINE STRUCTURE OF SODIUM BY A MICROWAVE ABSORPTION METHOD

29. J.H.VAN VLECK,PHYS.REV.83,880 (1951) THEORY OF THE HYPERFINE SPLITTING OF THE LEVELS K=1 IN NH3

30. J.H.VAN VLECK,REVS.MOD.PHYS.23,213-227(1951) THE COUPLING OF ANGULAR MOMENTUM VECTORS IN MOLECULES

31. R.BERINGER,ANN.N.Y.ACAD.SCI.55,814-821(1952) MICROWAVE RESONANCE ABSORPTION IN PARAMAGNETIC GASES

32. R.BERINGER AND E.B.RAWSON,PHYS.REV.86,607 (1952) LAMBDA-DOUBLING IN A MICROWAVE SPECTRUM OF NITRIC OXIDE

33. J.R.ESHBACH,R.E.HILLGER,AND M.W.P.STRANDBERG,PHYS.REV.85,532-539 (1952) THE NUCLEAR MAGNETIC MOMENT OF S(33) FROM MICROWAVE SPECTROSCOPY

34. J.R.ESHBACH AND M.W.P.STRANDBERG,PHYS.REV.85,24-34(1952) ROTATIONAL MAGNETIC MOMENTS OF $^1\Sigma$ MOLECULES

35. R.A.FROSCH AND H.M.FOLEY,PHYS.REV.88,1337-1349(1952) MAGNETIC HYPERFINE STRUCTURE IN DIATOMIC MOLECULES

36. C.K.JEN,ANN.N.Y.ACAD.SCI.55,822-830(1952) MOLECULAR AND NUCLEAR MAGNETIC MOMENTS

37. C.K.JEN,J.W.B.BORGHAUSEN,AND R.W.STANLEY,PHYS.REV.85,717(1952) SIGN DETERMINATION FOR MOLECULAR MAGNETIC MOMENTS

38. R.STERNHEIMER,PHYS.REV.86,316-324(1952) EFFECT OF THE ATOMIC CORE ON THE MAGNETIC HYPERFINE STRUCTURE

39. B.F.BURKE AND M.W.P.STRANDBERG,PHYS.REV.90,303-308(1953) ZEEMAN EFFECT IN ROTATIONAL SPECTRA OF ASYMMETRIC ROTOR MOLECULES

40. J.T.COX,P.B.PEYTON,JR.,AND W.GORDY,PHYS.REV.91,222 (1953) ZEEMAN EFFECT IN THE MICROWAVE SPECTRA OF METHYL FLUORIDE AND METHYL ACETYLENE

41. S.L.MILLER AND C.H.TOWNES,PHYS.REV.90,537-541(1953) THE MICROWAVE ABSORPTION SPECTRUM OF (O(16))2 AND O(16)O(17)

42. S.L.MILLER,C.H.TOWNES,AND M.KOTANI,PHYS.REV.90,542-543(1953) THE ELECTRONIC STRUCTURE OF O2

43. N.F.RAMSEY,PHYS.REV.91,303-307(1953) ELECTRON COUPLED INTERACTIONS BETWEEN NUCLEAR SPINS IN MOLECULES

44. T.M.SANDERS,A.L.SCHAWLOW,G.C.DOUSMANIS,AND C.H.TOWNES,PHYS.REV. 89,1158-1159(1953) A MICROWAVE SPECTRUM OF THE FREE OH RADICAL

45. J.O.ARTMAN AND J.P.GORDON,PHYS.REV.96,1237-1245(1954) ABSORPTION OF MICROWAVES BY OXYGEN IN THE MILLIMETER WAVELENGTH REGION

46. B.F.BURKE,M.W.P.STRANDBERG,V.W.COHEN,AND W.S.KOSKI,PHYS.REV.93, 193-194(1954) THE NUCLEAR MAGNETIC MOMENT OF S(35) BY MICROWAVE SPECTROSCOPY

47. G.C.DOUSMANIS,PHYS.REV.94,789 (1954) MICROWAVE SPECTRUM OF THE FREE OD RADICAL

48. J.P.GORDON,H.J.ZEIGER,AND C.H.TOWNES,PHYS.REV.95,282-284(1954) MOLECULAR MICROWAVE OSCILLATOR AND NEW HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF NH3

49. G.R.GUNTHER-MOHR,C.H.TOWNES,AND J.H.VAN VLECK,PHYS.REV.94,1191-1203 (1954) HYPERFINE STRUCTURE IN THE SPECTRUM OF N(14)H3. II. THEORETICAL DISCUSSION

50. M.MIZUSHIMA,PHYS.REV.94,569-574(1954) THEORY OF THE HYPERFINE STRUCTURE OF NO MOLECULE

51. M.MIZUSHIMA AND R.M.HILL,PHYS.REV.93,745-748(1954) MICROWAVE SPECTRUM OF O2

52. G.C.DOUSMANIS,T.M.SANDERS,AND C.H.TOWNES,PHYS.REV.100,1735-1754 (1955) MICROWAVE SPECTRA OF THE FREE RADICALS OH AND OD

53. C.C.LIN,PHYS.REV.99,666-667(1955) THEORY OF THE FINE STRUCTURE OF THE MICROWAVE SPECTRUM OF NO2

54. M.MIZUSHIMA,J.T.COX,AND W.GORDY,PHYS.REV.98,1034-1038(1955) ZEEMAN EFFECT IN THE ROTATIONAL SPECTRUM OF NITRIC OXIDE

55. M.TINKHAM AND M.W.P.STRANDBERG,PHYS.REV.97,937-951(1955) THEORY OF THE FINE STRUCTURE OF THE MOLECULAR OXYGEN GROUND STATE

56. Y.TORIZUKA,Y.KOJIMA,T.OKAMURA,AND K.KAMIRYO, J.PHYS.SOC.JAPAN 10, 417-420(1955) THE ZEEMAN EFFECT IN AMMONIA MICROWAVE SPECTRA

57. R.L.WHITE,REV.MOD.PHYS.27,276-288(1955) MAGNETIC HYPERFINE STRUCTURE DUE TO ROTATION IN $^1\Sigma$ MOLECULES

58. J.T.COX AND W.GORDY,PHYS.REV.101,1298-1300(1956) ZEEMAN EFFECT OF SOME LINEAR AND SYMMETRIC TOP MOLECULES

59. J.J.GALLAGHER AND C.M.JOHNSON,PHYS.REV.103,1727-1737(1956) UNCOUPLING EFFECTS IN THE MICROWAVE SPECTRUM OF NITRIC OXIDE

60. A.OKAYA,J.PHYS.SOC.JAPAN 11,249-258(1956) THEORETICAL ANALYSIS OF THE MAGNETIC HYPERFINE STRUCTURE OF THE MICROWAVE SPECTRUM OF C2V MOLECULES

61. G.F.HADLEY ,J.CHEM.PHYS.26,1482-1495(1957) THEORETICAL STUDY OF THE HYPERFINE STRUCTURE IN INVERSION SPECTRA OF THE DEUTEROAMMONIAS

62. G.F.HADLEY,PHYS.REV.108,291-293(1957) J=3,K=2 LINE IN THE INVERSION SPECTRUM OF N(14)H3

63. F.R.INNES,PHYS.REV.111,194-202(1958) MICROWAVE ZEEMAN EFFECT AND THEORY OF COMPLEX SPECTRA

64. D.W.POSENER,AUST.J.PHYS.11,1-17(1958) COUPLING OF NUCLEAR SPINS IN MOLECULES

65. B.ROSENBLUM,A.H.NETHERCOT,JR.,AND C.H.TOWNES,PHYS.REV.109,400-412 (1958) ISOTOPIC MASS RATIOS,MAGNETIC MOMENTS,AND THE SIGN OF THE ELECTRIC DIPOLE MOMENT IN CARBON MONOXIDE

66. J.C.BAIRD AND G.R.BIRD,BULL.AM.PHYS.SOC.4,68(1959) MAGNETIC HYPERFINE STRUCTURE IN THE ROTATIONAL SPECTRUM OF NITROGEN DIOXIDE

67. J.G.BAKER,BULL.AM.PHYS.SOC.4,290(1959) HYPERFINE STRUCTURE IN THE ROTATIONAL SPECTRA OF FREE RADICALS

68. C.A.BURRUS,J.CHEM.PHYS.30,976-983(1959) ZEEMAN EFFECT IN THE 1- TO 3-MILLIMETER WAVE REGION- MOLECULAR G FACTORS OF SEVERAL LIGHT MOLECULES

69. G.EHRENSTEIN,C.H.TOWNES,AND M.J.STEVENSON,PHYS.REV.LETTERS 3,40-41 (1959) GROUND STATE LAMBDA DOUBLING TRANSITIONS OF OH RADICAL

70. P.FAVERO,A.M.MIRRI,AND W.GORDY,PHYS.REV.114,1534-1537(1959) MILLIMETER-WAVE ROTATIONAL SPECTRUM OF NITRIC OXIDE IN THE STATE

71. C.C.LIN,PHYS.REV.116,903-910(1959) THEORY OF THE FINE STRUCTURE OF THE MICROWAVE SPECTRUM OF NITROGEN DIOXIDE

72. D.W.POSENER,SPECTROCHIM.ACTA 15,783 (1959) CONTRIBUTIONS OF HIGH-RESOLUTION MICROWAVE SPECTROSCOPY TO THE ELECTRONIC STRUCTURE OF THE WATER MOLECULE

73. H.E.RADFORD AND V.W.HUGHES,PHYS.REV.114,1274-1279(1959) MICROWAVE ZEEMAN SPECTRUM OF ATOMIC OXYGEN

74. H.TAKUMA,T.SHIMIZU,AND K.SHIMODA,J.PHYS.SOC.JAPAN 14,1595-1599(1959) MAGNETIC HYPERFINE SPECTRUM OF H2CO BY A MASER

75. P.THADDEUS AND J.LOUBSER,NUOVO CIMENTO 13,1060-1064(1959) BEAM MASER SPECTROSCOPY ON HDO

76. P.THADDEUS,J.LOUBSER,L.KRISHER,AND H.LECAR,J.CHEM.PHYS.31,1677-1678 (1959) BEAM MASER SPECTROSCOPY ON FORMALDEHYDF

77. K.KONDO,H.HIRAKAWA,A.MIYAHARA,T.OKA,AND K.SHIMODA,J.PHYS.SOC. JAPAN 15,303-306(1960) MICROWAVE ZEEMAN EFFECT OF HCHO

78. B.D.OSIPOV,OPTIKA I SPEKTROSKOPIYA 8,581-582(1960) I-J INTERACTION IN THE METHYL IODIDE MOLECULE

79. D.W.POSENER,AUST.J.PHYS.13,168-185(1960) HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF WATER II. EFFECTS OF MAGNETIC INTERACTIONS

80. M.S.CHILD AND H.C.LONGUET-HIGGINS,PHIL.TRANS.ROY.SOC.LONDON,254, 259-294(1961) STUDIES OF THE JAHN-TELLER EFFECT. III. THE ROTATIONAL AND VIBRATIONAL SPECTRA OF SYMMETRIC-TOP MOLECULES IN ELECTRONICALLY DEGENERATE STATES

81. R.F.CURL,JR. AND J.L.KINSEY,J.CHEM.PHYS.35,1758-1765(1961) CALCULATION OF INTERACTION MATRIX ELEMENTS FOR ASYMMETRIC ROTORS WITH RESULTANT ELECTRONIC SPIN AND NUCLEAR SPIN

82. H.E.RADFORD,PHYS.REV.122,114-130(1961) MICROWAVE ZEEMAN EFFECT OF FREE HYDROXYL RADICALS

83. H.TAKUMA,J.PHYS.SOC.JAPAN 16,309-317(1961) MAGNETIC HYPERFINE STRUCTURE IN THE ROTATIONAL SPECTRUM OF H2CO

84. A.GUARNIERI,P.FAVERO,A.M.MIRRI,AND G.SEMERANO,BOLL.SCI.FAC.CHIM. IND.BOLOGNA 20,105-109(1962) THE ZEEMAN EFFECT OF FORMYL FLUORIDE IN THE MILLIMETER WAVES REGION

85. H.E.RADFORD,PHYS.REV.126,1035-1045(1962) MICROWAVE ZEEMAN EFFECT OF FREE HYDROXYL RADICALS

86. E.B.TREACY AND Y.BEERS,J.CHEM.PHYS.36,1473-1480(1962) HYPERFINE STRUCTURE OF THE ROTATIONAL SPECTRUM OF HDO

87. G.EHRENSTEIN,PHYS.REV.130,669-674(1963) HYPERFINE STRUCTURE IN O(17)H AND THE OH DIPOLE MOMENT

88. L.PIERCE AND N.DICIANNI,J.CHEM.PHYS.38,2029-2030(1963) SPIN-ROTATIONAL HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF OXYGEN DIFLUORIDE

89. G.R.BIRD,J.C.BAIRD,A.W.JACHE,J.A.HODGESON,R.F.CURL JR.,A.C.KUNKLE, J.W.BRANSFORD,J.RASTRUP-ANDERSEN,AND J.ROSENTHAL,J.CHEM.PHYS.40, 3378-3390(1964) MICROWAVE SPECTRUM OF NO2- FINE STRUCTURE AND MAGNETIC COUPLING

90. S.I.CHAN,D.IKENBERRY, AND T.P.DAS, J.CHEM.PHYS.41,2107-2110(1964) REMARKS ON THE DETERMINATION OF ELECTRIC DIPOLE MOMENTS FROM ROTATIONAL MAGNETIC MOMENTS. THE DIPOLE MOMENT OF HYDROGEN FLUORIDE

91. Y.CHIU,J.CHEM.PHYS.41,3235-3249(1964) ROTATION-ELECTRONIC INTERACTION IN THE RYDBERG STATES OF DIATOMIC MOLECULES

92. K.M.EVENSON,J.L.DUNN,AND H.P.BROIDA,PHYS.REV.136,1566-1571(1964) OPTICAL DETECTION OF MICROWAVE TRANSITIONS BETWEEN EXCITED ELECTRONIC STATES OF CN AND THE IDENTIFICATION OF THE TRANSITIONS INVOLVED

93. F.X.POWELL AND D.R.LIDE,JR.,J.CHEM.PHYS.41,1413-1419(1964) MICROWAVE SPECTRUM OF THE SO RADICAL

94. H.E.RADFORD,PHYS.REV.136,1571-1575(1964) HYPERFINE STRUCTURE OF THE B $^2\Sigma^+$ STATE OF CN

95. W.T.RAYNES,J.CHEM.PHYS.41,3020-3032(1964) SPIN SPLITTINGS AND ROTATIONAL STRUCTURES OF NONLINEAR MOLECULES IN DOUBLET AND TRIPLET ELECTRONIC STATES

96. P.THADDEUS,L.C.KRISHER,AND P.CAHILL,J.CHEM.PHYS.41,1542-1547(1964) HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF NH2D

97. P.THADDEUS,L.C.KRISHER, AND J.H.N.LOUBSER,J.CHEM.PHYS.40,257-273 (1964) HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF HDO,HDS, CH2O,AND CHDO- BEAM-MASER SPECTROSCOPY ON ASYMMETRIC-TOP MOLECULES

Section XII. GENERAL MICROWAVE PAPERS AND RELATED TOPICS

1. H.A.KRAMERS,Z.PHYSIK 39,828-840(1926) WAVE MECHANICS AND SEMI-NUMERICAL QUANTIZATION

2. M.BORN AND J.R.OPPENHEIMER,ANN.PHYSIK 4-84,457-484(1927) QUANTUM THEORY OF MOLECULES

3. B.PODOLSKY, PHYS.REV. 32,812-816(1928) QUANTUM-MECHANICALLY CORRECT FORM OF HAMILTONIAN FUNCTION FOR CONSERVATIVE SYSTEMS

4. P.M.MORSE,PHYS.REV.34,57-64(1929) DIATOMIC MOLECULES ACCORDING TO THE WAVE MECHANICS II.VIBRATIONAL LEVELS

5. C.ECKART,REV.MOD.PHYS.2,305-380(1930) THE APPLICATION OF GROUP THEORY TO THE QUANTUM DYNAMICS OF MONATOMIC SYSTEMS

6. R.S.MULLIKEN,REVS.MOD.PHYS.2,60-115(1930) THE INTERPRETATION OF BAND SPECTRA PARTS I,IIA,IIB

7. D.M.DENNISON,REVS.MOD.PHYS.3,280-345(1931) THE INFRARED SPECTRA OF POLYATOMIC MOLECULES. PART I.

8. E.FERMI,Z.PHYSIK 71,250-259(1931) ON THE RAMAN EFFECT IN CARBON DIOXIDE

9. R.S.MULLIKEN,REVS.MOD.PHYS.3,89-155(1931) THE INTERPRETATION OF BAND SPECTRA.PART IIC.EMPIRICAL BAND TYPES

10. E.WIGNER, GROUP THEORY AND ITS APPLICATION TO THE QUANTUM MECHANICS OF ATOMIC SPECTRA,BRAUNSCHWEIG(1931)

11. H.EYRING,J.AM.CHEM.SOC.54,3191-3203(1932) STERIC HINDERANCE AND COLLISION DIAMETERS

12. R.DE L. KRONIG,PHYSICA 1,617-622(1933) NOTE ON THE DETERMINATION OF ISOTOPIC MASSES FROM BAND SPECTRA

13. G.PLACZEK AND E.TELLER,Z.PHYSIK 81,209-258(1933) ROTATION STRUCTURE OF THE RAMAN BANDS OF POLYATOMIC MOLECULES

14. N.WRIGHT AND H.M.RANDALL,PHYS.REV.44,391-398(1933) THE FAR INFRARED ABSORPTION SPECTRA OF AMMONIA AND PHOSPHINE GASES UNDER HIGH RESOLVING POWER

15. C.E.CLEETON AND N.H.WILLIAMS,PHYS.REV.45,234-237(1934) ELECTROMAGNETIC WAVES OF 1.1 CM WAVE-LENGTH AND THE ABSORPTION SPECTRUM OF AMMONIA

16. G.H.DIEKE AND G.B.KISTIAKOWSKY,PHYS.REV.45,4-28(1934) THE STRUCTURE OF THE ULTRAVIOLET ABSORPTION SPECTRUM OF FORMALDEHYDE. I

17. C.ECKART,PHYS.REV.46,383-387(1934) THE KINETIC ENERGY OF POLYATOMIC MOLECULES

18. G.HERZBERG,F.PATAT,AND J.W.T.SPINKS,Z.PHYSIK 92,87-99(1934) ROTATION VIBRATION SPECTRA OF MOLECULES CONTAINING DEUTERIUM. PART I. SPECTRUM OF C_2HD AND THE C-C AND C-H DISTANCES IN ACETYLENE

19. O.M.JORDAHL,PHYS.REV.45,87-97(1934) THE EFFECT OF CRYSTALLINE ELECTRIC FIELDS ON THE PARAMAGNETIC SUSCEPTIBILITY OF CUPRIC SALTS

20. C.L.PEKERIS,PHYS.REV.45,98-103(1934) THE ROTATION-VIBRATION COUPLING IN DIATOMIC MOLECULES

21. P.F.BARTUNEK AND E.F.BARKER,PHYS.REV.48,516-521(1935) THE INFRARED ABSORPTION SPECTRA OF THE LINEAR MOLECULES CARBONYL SULFIDE AND DEUTERIUM CYANIDE

22. F.H.CRAWFORD AND T.JORGENSEN,JR.,PHYS.REV.47,358-366(1935) THE BAND SPECTRA OF THE HYDRIDES OF LITHIUM.PART I. LI(7)D

23. F.H.CRAWFORD AND T.JORGENSEN,JR.,PHYS.REV.47,932-941(1935) THE BAND SPECTRA OF THE HYDRIDES OF LITHIUM

24. C.ECKART,PHYS.REV.47,552-558(1935) SOME STUDIES CONCERNING ROTATING AXES AND POLYATOMIC MOLECULES

25. L.PAULING AND E.B.WILSON,JR.,INTRODUCTION TO QUANTUM MECHANICS, MCGRAW-HILL BOOK COMPANY INC,NEW YORK(1935)

26. J.H.VAN VLECK,PHYS.REV.47,487-494(1935) THE ROTATIONAL ENERGY OF POLYATOMIC MOLECULES

27. E.B.WILSON,JR.,J.CHEM.PHYS.3,276-285(1935) THE STATISTICAL WEIGHTS OF THE ROTATIONAL LEVELS OF POLYATOMIC MOLECULES,INCLUDING METHANE, AMMONIA,BENZENE,CYCLOPROPANE,AND ETHYLENE

28. E.B.WILSON,JR.,J.CHEM.PHYS.3,818-821(1935) SYMMETRY CONSIDERATIONS CONCERNING THE SPLITTING OF VIBRATION-ROTATION LEVELS IN POLYATOMIC MOLECULES

29. F.H.CRAWFORD AND T.JORGENSEN,JR.,PHYS.REV.49,745-752(1936) THE BAND SPECTRA OF THE HYDRIDES OF LITHIUM.PART III.POTENTIAL CURVES AND ISOTOPE RELATIONS.

30. C.GILBERT,PHYS.REV.49,619-624(1936) THE THEORY OF THE BAND SPECTRA OF PH AND NH

31. J.H.VAN VLECK,J.CHEM.PHYS.4,327-338(1936) ON THE ISOTOPE CORRECTIONS IN MOLECULAR SPECTRA

32. A.BUDO,Z.PHYSIK 105,73-80(1937) ROTATIONAL STRUCTURE OF $^4\Sigma \longrightarrow {}^4\Pi$ BANDS

33. B.L.CRAWFORD AND P.C.CROSS,J.CHEM.PHYS.5,621-625(1937) ELEMENTS OF THE FACTORED SECULAR EQUATION FOR THE SEMI-RIGID WATER TYPE ROTATOR WITH APPLICATION TO THE HYDROGEN SULFIDE BAND AT 10,000 A

34. J.B.HOWARD,J.CHEM.PHYS.5,442-450(1937) THE NORMAL VIBRATIONS AND THE VIBRATIONAL SPECTRUM OF C2H6

35. E.C.KEMBLE,FUNDAMENTAL PRINCIPLES OF QUANTUM MECHANICS,MCGRAW-HILL BOOK COMPANY INC.,NEW YORK(1937)

36. T.E.NEVIN,NATURE 140,1101(1937) ROTATIONAL ANALYSIS OF THE VISIBLE O2+ BANDS

37. T.E.NEVIN,PHIL.TRANS.ROY.SOC.LONDON 237,471-507(1938) ROTATIONAL ANALYSIS OF THE FIRST NEGATIVE BAND SPECTRUM OF OXYGEN

38. E.B.WILSON,JR.,J.CHEM.PHYS.6,740-745(1938) NUCLEAR SPIN AND SYMMETRY EFFECTS IN THE HEAT CAPACITY OF ETHANE GAS

39. H.MARGENAU,REVS.MOD.PHYS.11,1-35(1939) VAN DER WAALS FORCES

40. T.Y.WU,VIBRATIONAL SPECTRA AND STRUCTURE OF POLYATOMIC MOLECULES, NATIONAL UNIVERSITY OF PEKING,KUN-MING,CHINA(1939)

41. B.T.DARLING AND D.M.DENNISON,PHYS.REV.57,128-139(1940) THE WATER VAPOR MOLECULE

42. D.M.DENNISON,REVS.MOD.PHYS.12,175-214(1940) INFRA-RED SPECTRA OF POLYATOMIC MOLECULES. PART II.

43. I.SANDEMAN,PROC.ROY.SOC.EDINBURGH 60,210-223(1940) ENERGY LEVELS OF A ROTATING VIBRATOR

44. E.B.WILSON,JR.,CHEM.REVS.27,17-38(1940) THE PRESENT STATUS OF THE STATISTICAL METHOD OF CALCULATING THERMODYNAMIC FUNCTIONS

45. H.M.HULBURT AND J.O.HIRSCHFELDER,J.CHEM.PHYS.9,61-69(1941) POTENTIAL ENERGY FUNCTIONS FOR DIATOMIC MOLECULES

46. V.SCHOMAKER AND D.P.STEVENSON,J.AM.CHEM.SOC. 63,37-40(1941) SOME REVISIONS OF THE COVALENT RADII AND THE ADDITIVITY RULE FOR THE LENGTHS OF PARTIALLY IONIC SINGLE COVALENT BONDS

47. H.EYRING,J.WALTER, AND G.E.KIMBALL,QUANTUM CHEMISTRY, JOHN WILEY AND SONS INC.,NEW YORK(1944)

48. G.E.BECKER AND S.H.AUTLER,PHYS.REV.70,300-307(1946) WATER VAPOR ABSORPTION OF ELECTROMAGNETIC RADIATION IN THE CENTIMETER WAVE-LENGTH RANGE

49. R.BERINGER,PHYS.REV.70,53-57(1946) THE ABSORPTION OF ONE -HALF CENTIMETER ELECTROMAGNETIC WAVES IN OXYGEN

50. B.BLEANEY AND R.P.PENROSE,NATURE 157,339-340(1946) AMMONIA SPECTRUM IN THE 1 CM WAVELENGTH REGION

51. D.K.COLES AND W.E.GOOD,PHYS.REV.70,979(1946) STARK AND ZEEMAN EFFECTS IN THE INVERSION SPECTRUM OF AMMONIA

52. D.TER HAAR,PHYS.REV.70,222-223(1946) THE VIBRATIONAL LEVELS OF AN ANHARMONIC OSCILLATOR

53. L.N.HADLEY AND D.M.DENNISON,PHYS.REV.70,780-781(1946) THE MICROWAVE SPECTRUM OF AMMONIA

54. W.D.HERSCHBERGER,J.APPL.PHYS.17,495-500(1946) THE ABSORPTION OF MICROWAVES BY GASES

55. C.I.BEARD AND B.P.DAILEY,J.CHEM.PHYS.15,762(1947) MICROWAVE SPECTRUM AND STRUCTURE OF ISOTHIOCYANIC ACID

56. D.K.COLES,E.S.ELYASH,AND J.G.GORMAN,PHYS.REV.72,973(1947) MICROWAVE ABSORPTION SPECTRA OF N2O

57. B.P.DAILEY,S.GOLDEN, AND E.B.WILSON,JR.,PHYS.REV.72,871-872(1947) PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF SO2

58. B.P.DAILEY AND E.B.WILSON,JR.,PHYS.REV.72,522 (1947) MICROWAVE SPECTRA OF SEVERAL POLYATOMIC MOLECULES

59. T.W.DAKIN,W.E.GOOD,AND D.K.COLES,PHYS.REV.71,640-641(1947) BOND DISTANCES IN OCS FROM MICROWAVE ABSORPTION LINES

60. W.E.GOOD AND D.K.COLES,PHYS.REV.71,383-384(1947) MICROWAVE ABSORPTION FREQUENCIES OF N(14)H3 AND N(15)H3

61. W.E.GOOD AND D.K.COLES,PHYS.REV.72,157 (1947) PRECISION FREQUENCY MEASUREMENTS OF MICROWAVE ABSORPTION LINES AND THEIR FINE STRUCTURE

62. W.GORDY AND M.KESSLER,PHYS.REV.71,640(1947) MICROWAVE SPECTRA-THE HYPERFINE STRUCTURE OF AMMONIA

63. W.GORDY,J.W.SIMMONS,AND A.G.SMITH,PHYS.REV.72,344-345(1947) NUCLEAR AND MOLECULAR CONSTANTS FROM MICROWAVE SPECTRA- METHYL CHLORIDE AND METHYL BROMIDE

64. W.GORDY,A.G.SMITH,AND J.W.SIMMONS,PHYS.REV.71,917(1947) MICROWAVE SPECTRA-METHYL IODIDE

65. W.GORDY,A.G.SMITH,AND J.W.SIMMONS,PHYS.REV.72,249-250(1947) ANALYSIS OF THE HYPERFINE STRUCTURE IN THE MICROWAVE SPECTRUM OF THE SYMMETRIC TOP MOLECULE CH3I

66. W.GORDY,W.V.SMITH,A.G.SMITH, AND H.RING,PHYS.REV.72,259-260(1947) MILLIMETER-WAVE SPECTRA HYPERFINE STRUCTURE OF BRCN AND ICN

67. W.D.HERSCHBERGER AND J.TURKEVICH,PHYS.REV.71,554(1947) ABSORPTION OF METHYL ALCOHOL AND METHYLAMINE FOR 1.25-CM WAVES

68. R.E.HILLGER,M.W.P.STRANDBERG,T.WENTINK,AND R.KYHL,PHYS.REV.72,157 (1947) THE MICROWAVE ABSORPTION SPECTRUM OF CARBONYL SULFIDE

69. G.W.KING AND R.M.HAINER,PHYS.REV.71,135 (1947) INTERPRETATION OF THE MICROWAVE ABSORPTION OF HDO AT 1.3 CENTIMETERS

70. G.W.KING,R.M.HAINER, AND P.C.CROSS,PHYS.REV.71,433-443(1947) EXPECTED MICROWAVE ABSORPTION COEFFICIENTS OF WATER AND RELATED MOLECULES

71. H.RING,H.EDWARDS,M.KESSLER,AND W.GORDY,PHYS.REV.72,1262-1263(1947) MICROWAVE SPECTRA-METHYL CYANIDE AND METHYL ISOCYANIDE

72. W.V.SMITH AND R.L.CARTER,PHYS.REV.72,638-639(1947) SATURATION EFFECT IN MICROWAVE SPECTRUM OF AMMONIA

73. C.H.TOWNES,A.N.HOLDEN,AND F.R.MERRITT,PHYS.REV.71,64(1947) ROTATIONAL SPECTRA OF SOME LINEAR MOLECULES NEAR 1-CM WAVE-LENGTH

74. C.H.TOWNES,A.N.HOLDEN,AND F.R.MERRITT,PHYS.REV.72,513-514(1947)

75. R.T.WEIDNER,PHYS.REV.72,1268-1269(1947) THE MICROWAVE SPECTRUM OF IODINE MONOCHLORIDE AT 4.5 CENTIMETERS WAVE-LENGTH

76. D.WILLIAMS,PHYS.REV.72,974(1947) FURTHER WORK ON SATELLITES IN THE MICROWAVE SPECTRUM OF AMMONIA

77. G.L.CUNNINGHAM,W.I.LEVAN, AND W.D.GWINN,PHYS.REV.74,1537(1948) THE ROTATIONAL SPECTRUM OF ETHYLENE OXIDE

78. B.P.DAILEY,K.RUSINOW,R.G.SHULMAN,AND C.H.TOWNES,PHYS.REV.74,1245-1246 (1948) PURE ROTATIONAL SPECTRUM OF ASF3

79. W.F.EDGELL AND A.ROBERTS,J.CHEM.PHYS.16,1002(1948) THE MOMENT OF INERTIA OF CF3CH3

80. A.FLETCHER,MATH.TABLES AND OTHER AIDS TO COMPUTATION 3,27-29(1948) G.W.KING PUNCHED -CARD METHODS IN ANALYZING INFRA-RED SPECTRA

81. O.R.GILLIAM,H.D.EDWARDS, AND W.GORDY,PHYS.REV.73,635-636(1948) ANOMALIES IN THE HYPERFINE STRUCTURE OF CH3I AND ICN

82. W.GORDY,J.W.SIMMONS,AND A.G.SMITH,PHYS.REV.74,243-249(1948) MICROWAVE DETERMINATION OF THE MOLECULAR STRUCTURES AND NUCLEAR COUPLINGS OF THE METHYL HALIDES

83. R.S.HENDERSON,PHYS.REV.74,107(1948) ON THE FINE STRUCTURE IN THE INVERSION SPECTRUM OF AMMONIA ERRATUM-PHYS.REV.74,626(1948)

84. M.KESSLER AND W.GORDY,PHYS.REV.74,123 (1948) METHODS IN MICROWAVE SPECTROSCOPY

85. M.MIZUSHIMA,PHYS.REV.74,705-706(1948) ON THE AMMONIA MOLECULE

86. A.ROBERTS,PHYS.REV.73,1405(1948) ROTATIONAL SPECTRUM OF OC(14)S AND THE NUCLEAR SPIN OF C(14)

87. A.H.SHARBAUGH,PHYS.REV.74,1870(1948) MICROWAVE DETERMINATION OF THE MOLECULAR STRUCTURE OF CHLOROSILANE

88. R.G.SHULMAN,B.P.DAILEY,AND C.H.TOWNES,PHYS.REV.74,846(1948) PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF ETHYLENE OXIDE

89. H.A.SKINNER,J.CHEM.PHYS.16,553-554(1948) THE GEOMETRY OF CH3X MOLECULES

90. A.G.SMITH,H.RING,W.V.SMITH, AND W.GORDY,PHYS.REV.74,370-372(1948) INTERATOMIC DISTANCES AND NUCLEAR QUADRUPOLE COUPLINGS IN CLCN, BRCN, AND ICN

91. M.W.P.STRANDBERG,PHYS.REV.74,1245 (1948) MICROWAVE ROTATIONAL ABSORPTION IN D2O

92. C.H.TOWNES,A.N.HOLDEN,AND F.R.MERRITT,PHYS.REV.74,1113-1133(1948) MICROWAVE SPECTRA OF SOME LINEAR XYZ MOLECULES

93. C.H.TOWNES,F.R.MERRITT,AND B.D.WRIGHT,PHYS.REV.73,1334-1337(1948) THE PURE ROTATIONAL SPECTRUM OF ICL

94. B.BAK,E.S.KNUDSEN,AND E.MADSEN,PHYS.REV.75,1622-1623(1949) MICROWAVE ABSORPTION OF SOME ORGANIC VAPORS

95. C.I.BEARD AND B.P.DAILEY,J.AM.CHEM.SOC.71,929-936(1949) THE MICROWAVE SPECTRA OF CH3NCS AND CH3SCN

96. D.BIANCO,G.MATLACK,AND A.ROBERTS,PHYS.REV.76,473 (1949) ISOTOPIC FREQUENCIES IN THE MICROWAVE SPECTRA OF OCS AND CH3CL

97. J.K.BRAGG AND A.H.SHARBAUGH,PHYS.REV.75,1774-1775(1949) MICROWAVE SPECTRUM OF FORMALDEHYDE

98. D.K.COLES AND R.H.HUGHES,PHYS.REV.76,178 (1949) MICROWAVE SPECTRA OF NITROUS OXIDE

99. D.K.COLES AND R.H.HUGHES,PHYS.REV.76,858(1949) MICROWAVE SPECTRUM OF CF3CL

100. G.L.CUNNINGHAM,A.W.BOYD,W.D.GWINN,AND W.I.LEVAN,J.CHEM.PHYS.17, 211-212(1949) STRUCTURE OF ETHYLENE OXIDE

101. B.P.DAILEY,J.M.MAYS,AND C.H.TOWNES,PHYS.REV.76,136-137(1949) MICROWAVE ROTATIONAL SPECTRA AND STRUCTURES OF GEH3CL,SIH3CL,AND CH3CL

102. H.D.EDWARDS,O.R.GILLIAM,AND W.GORDY,PHYS.REV.76,196 (1949) MICROWAVE SPECTRUM OF METHYL ALCOHOL AND OF METHYL AMINE

103. D.A.GILBERT,A.ROBERTS, AND P.A.GRISWOLD,PHYS.REV.76,1723(1949) NUCLEAR AND MOLECULAR INFORMATION FROM THE MICROWAVE SPECTRUM OF FCL

104. O.R.GILLIAM,H.D.EDWARDS,AND W.GORDY,PHYS.REV.75,1014-1016(1949) MICROWAVE INVESTIGATIONS OF METHYL FLUORIDE,FLUOROFORM, AND PHOSPHORUS TRI-FLUORIDE

105. W.LOW AND C.H.TOWNES,PHYS.REV.75,529-530(1949) O(17) AND S(36) IN THE ROTATIONAL SPECTRUM OF OCS

106. M.MIZUSHIMA,J.PHYS.SOC.JAPAN 4,191-196(1949) ON THE AMMONIA MOLECULE II.

107. W.J.PIETENPOL AND J.D.ROGERS ,PHYS.REV.76,690-691(1949) MICROWAVE ABSORPTION SPECTRUM OF METHYLENE BROMIDE

108. A.ROBERTS AND W.F.EDGELL,J.CHEM.PHYS.17,742-743(1949) THE MICROWAVE SPECTRUM OF CF2=CH2

109. A.H.SHARBAUGH ,J.K.BRAGG,T.C.MADISON,AND V.G.THOMAS,PHYS.REV.76,1419 (1949) THE DETERMINATION OF THE MOLECULAR STRUCTURE OF BROMOSILANE BY MICROWAVE MEASUREMENTS

110. A.H.SHARBAUGH AND J.MATTERN,PHYS.REV.75,1102(1949) MICROWAVE SPECTRUM OF METHYL BROMIDE

111. J.W.SIMMONS,PHYS.REV.76,686(1949) THE MICROWAVE SPECTRA OF CD3CL AND CD3I

112. W.V.SMITH AND R.R.UNTERBERGER,J.CHEM.PHYS.17,1348(1949) MICROWAVE

INVESTIGATIONS OF CHLOROFORM

113. M.W.P.STRANDBERG,J.CHEM.PHYS.17,901-904(1949) ROTATIONAL ABSORPTION SPECTRUM OF HDO

114. M.W.P.STRANDBERG,C.Y.MENG,AND J.G.INGERSOLL,PHYS.REV.75,1524-1528 (1949) THE MICROWAVE ABSORPTION SPECTRUM OF OXYGEN

115. M.W.P.STRANDBERG,C.S.PEARSALL,AND M.T.WEISS,J.CHEM.PHYS.17,429(1949) ON THE ELECTRIC DIPOLE MOMENT AND VIBRATIONAL STATES OF H3B(10)CO

116. M.W.P.STRANDBERG,T.WENTINK,JR., AND A.G.HILL,PHYS.REV.75,827-832 (1949) THE MICROWAVE SPECTRUM OF CARBONYL SELENIDE

117. M.W.P.STRANDBERG,T.WENTINK,JR., AND R.L.KYHL,PHYS.REV.75,270-278 (1949) ROTATIONAL ABSORPTION SPECTRUM OF OCS

118. A.A.WESTENBERG,J.H.GOLDSTEIN, AND E.B.WILSON,JR.,J.CHEM.PHYS.17, 1319-1321(1949) THE MICROWAVE SPECTRUM OF CHLOROACETYLENE AND DEUTEROCHLOROACETYLENE

119. E.AMBLE AND B.P.DAILEY,J.CHEM.PHYS.18,1422(1950) THE STRUCTURE AND DIPOLE MOMENT OF HYDRAZOIC ACID

120. B.BAK,E.S.KNUDSEN,E.MADSEN,AND J.RASTRUP-ANDERSEN,PHYS.REV.79,190 (1950) PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF KETENE

121. B.BAK,R.SLOAN,AND D.WILLIAMS,PHYS.REV.80,101-102(1950) MICROWAVE INVESTIGATION OF SCSE

122. C.I.BEARD AND B.P.DAILEY,J.CHEM.PHYS.18,1437-1441(1950) THE STRUCTURE AND DIPOLE MOMENT OF ISOTHIOCYANIC ACID ERRATA-J.CHEM.PHYS.19,975(1951)

123. H.J.BERNSTEIN,J.CHEM.PHYS.18,1514(1950) THE STRUCTURE OF NITROSYL CHLORIDE FROM THE MICROWAVE ABSORPTION SPECTRUM

124. J.K.BRAGG,T.C.MADISON,AND A.H.SHARBAUGH,PHYS.REV.77,148-149(1950) MICROWAVE SPECTRUM OF CH2CFCL ERRATA-PHYS.REV.77,571(1950)

125. D.K.COLES,W.E.GOOD, AND R.H.HUGHES,PHYS.REV.79,224 (1950) MICROWAVE SPECTRUM OF METHYL CYANIDE AND ITS ISOTOPIC MODIFICATIONS

126. C.D.CORNWELL,J.CHEM.PHYS.18,1118-1119(1950) MICROWAVE SPECTRA OF BROMODIBORANE AND VINYL BROMIDE

127. S.GESCHWIND,H.MINDEN, AND C.H.TOWNES,PHYS.REV.78,174-175(1950) MICROWAVE MEASUREMENTS ON THE STABLE SELENIUM ISOTOPES IN OCSE

128. O.R.GILLIAM,C.M.JOHNSON, AND W.GORDY,PHYS.REV.78,140-144(1950) MICROWAVE SPECTROSCOPY IN THE REGION FROM TWO TO THREE MILLIMETERS

129. B.M.GIRDWOOD,CAN.J.RESEARCH 28A,180-189(1950) THE MICROWAVE ABSORPTION SPECTRUM OF METHANOL

130. W.GORDY,H.RING,AND A.B.BURG,PHYS.REV.78,512-517(1950) MICROWAVE DETERMINATION OF THE STRUCTURE OF BORINE CARBONYL AND OF THE NUCLEAR MOMENTS OF THE STABLE BORON ISOTOPES

131. W.GORDY AND J.SHERIDAN,PHYS.REV.79,224 (1950) MICROWAVE SPECTRA OF THE METHYL MERCURIC HALIDES

132. L.H.JONES,J.N.SHOOLERY,R.G.SHULMAN,AND D.M.YOST,J.CHEM.PHYS.18, 990-991(1950) THE MOLECULAR STRUCTURE OF ISOCYANIC ACID FROM MICROWAVE AND INFRARED ABSORPTION SPECTRA

133. W.KESSLER,H.RING,R.TRAMBARULO, AND W.GORDY,PHYS.REV.79,54-56(1950) MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF METHYL CYANIDE AND METHYL ISOCYANIDE

134. P.KISLIUK AND C.H.TOWNES,J.CHEM.PHYS.18,1109-1111(1950) THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURE OF PHOSPHORUS AND ARSENIC TRICHLORIDE

135. J.H.N.LOUBSER AND J.A.KLEIN,PHYS.REV.78,348 (1950) ABSORPTION OF MILLIMETER WAVES IN ND3

136. W.LOW AND C.H.TOWNES,PHYS.REV.80,608-611(1950) EVIDENCE FROM NUCLEAR MASSES ON PROPOSED CLOSED SHELLS AT 20 NUCLEONS

137. G.MATLACK,G.GLOCKER,D.R.BIANCO, AND A.ROBERTS,J.CHEM.PHYS.18, 332-334(1950) THE MICROWAVE SPECTRA OF ISOTOPIC METHYL CHLORIDE

138. H.T.MINDEN,J.M.MAYS,AND B.P.DAILEY,PHYS.REV.78,347 (1950) THE MICROWAVE SPECTRUM OF CH3SIF3

139. W.J.PIETENPOL,J.D.ROGERS,AND D.WILLIAMS,PHYS.REV.78,480-481(1950) MICROWAVE SPECTRA OF ASYMMETRIC TOP MOLECULES

140. S.J.SENATORE,PHYS.REV.78,293-294(1950) MICROWAVE ABSORPTION SPECTRA OF POF3

141. A.H.SHARBAUGH ,B.S.PRITCHARD,AND T.C.MADISON,PHYS.REV.77,302(1950) MICROWAVE SPECTRUM OF CF3BR

142. A.H.SHARBAUGH,B.S.PRITCHARD,V.G.THOMAS,J.M.MAYS,AND B.P.DAILEY, PHYS.REV.79,189(1950) THE MICROWAVE ROTATIONAL SPECTRUM AND STRUCTURE OF BROMOGERMANE

143. A.H.SHARBAUGH,V.G.THOMAS,AND B.S.PRITCHARD,PHYS.REV.78,64-65(1950) A DETERMINATION OF THE DIPOLE MOMENT AND MOLECULAR STRUCTURE OF FLUOROSILANE

144. J.SHERIDAN AND W.GORDY,PHYS.REV.77,292-293(1950) INTERATOMIC DISTANCES IN CF3BR,CF3I,AND CF3CN

145. J.SHERIDAN AND W.GORDY,PHYS.REV.77,719(1950) MICROWAVE SPECTRA AND MOLECULAR CONSTANTS OF TRIFLUOROSILANE DERIVATIVES. SIF3H, SIF3CH3,SIF3CL,AND SIF3BR

146. J.SHERIDAN AND W.GORDY,PHYS.REV.79,224(1950) MICROWAVE SPECTRUM OF METHYL BROMOACETYLENE

147. J.SHERIDAN AND W.GORDY,PHYS.REV.79,513-515(1950) THE NUCLEAR QUADRUPOLE MOMENT OF N(14) AND THE STRUCTURE OF NITROGEN TRIFLUORIDE FROM MICROWAVE SPECTRA

148. J.W.SIMMONS,W.E.ANDERSON,AND W.GORDY,PHYS.REV.77,77-79(1950) MICROWAVE SPECTRUM AND MOLECULAR CONSTANTS OF HYDROGEN CYANIDE ERRATA-PHYS.REV.86,1055(1952)

149. J.W.SIMMONS AND W.O.SWAN,PHYS.REV.80,289-290(1950) THE STRUCTURE OF METHYL BROMIDE FROM MICROWAVE SPECTRA

150. D.F.SMITH,M.TIDWELL, AND D.V.P.WILLIAMS,PHYS.REV.77,420-421(1950) THE MICROWAVE SPECTRUM OF BROMINE MONOFLUORIDE

151. D.F.SMITH,M.TIDWELL, AND D.V.P.WILLIAMS,PHYS.REV.79,1007-1008(1950) THE MICROWAVE SPECTRUM OF BRCL

152. A.L.SOUTHERN,H.W.MORGAN,G.W.KEILHOLTZ,AND W.V.SMITH,PHYS.REV.78, 639 -(1950) THE ISOTOPIC ANALYSIS OF NITROGEN BY MEANS OF A MICROWAVE MASS SPECTROGRAPH

153. R.TRAMBARULO AND W.GORDY,PHYS.REV.79,224-225 (1950) MICROWAVE SPECTRA AND MOLECULAR CONSTANTS OF CD3NC AND CD3CN

154. R.TRAMBARULO AND W.GORDY,J.CHEM.PHYS.18,1613-1616(1950) THE MICROWAVE SPECTRUM AND STRUCTURE OF METHYL ACETYLENE

155. R.R.UNTERBERGER,R.TRAMBARULO, AND W.V.SMITH,J.CHEM.PHYS.18,565-566 (1950) MICROWAVE DETERMINATION OF THE STRUCTURE OF CHLOROFORM

156. A.A.WESTENBERG AND E.B.WILSON,JR.,J.AM.CHEM.SOC.72,199-200(1950) THE MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF CYANOACETYLENE

157. J.Q.WILLIAMS AND W.GORDY,J.CHEM.PHYS.18,994-995(1950) MICROWAVE SPECTRA AND MOLECULAR CONSTANTS OF TERTIARY BUTYL CHLORIDE,BROMIDE, AND IODIDE

158. J.Q.WILLIAMS AND W.GORDY,PHYS.REV.79,225 (1950) MICROWAVE SPECTRUM OF BROMOFORM AND PHOSPHORUS TRIBROMIDE

159. E.AMBLE,PHYS.REV.83,210 (1951) THE STRUCTURE AND DIPOLE MOMENT OF TRIOXANE

160. W.E.ANDERSON,J.SHERIDAN, AND W.GORDY,PHYS.REV.81,819-821(1951) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF GEF3CL

161. W.E.ANDERSON,R.TRAMBARULO,J.SHERIDAN, AND W.GORDY,PHYS.REV.82,58-60 (1951) THE MICROWAVE SPECTRUM AND MOLECULAR CONSTANTS OF TRIFLUOROMETHYL ACETYLENE

162. D.G.BURKHARD AND D.M.DENNISON,PHYS.REV.84,408-417(1951) THE MOLECULAR STRUCTURE OF METHYL ALCOHOL

163. R.O.CARLSON,C.A.LEE, AND B.P.FABRICAND,PHYS.REV.85,784-787(1951) THE MOLECULAR BEAM ELECTRIC RESONANCE METHOD STUDY OF THALLIUM MONOCHLORIDE

164. G.F.CRABLE AND W.V.SMITH,J.CHEM.PHYS.19,502(1951) THE STRUCTURE AND DIPOLE MOMENT OF SO2 FROM MICROWAVE SPECTRA

165. G.L.CUNNINGHAM,JR.,A.W.BOYD,R.J.MYERS,W.D.GWINN, AND W.F.LEVAN, J.CHEM.PHYS.19,676-685(1951) THE MICROWAVE SPECTRA,STRUCTURE, AND DIPOLE MOMENTS OF ETHYLENE OXIDE AND ETHYLENE SULFIDE

166. S.GESCHWIND AND R.GUNTHER-MOHR,PHYS.REV.81,882-883(1951) MICROWAVE STUDY OF GE,SI, AND S MASSES

167. R.H.HUGHES,W.E.GOOD, AND D.K.COLES,PHYS.REV.84,418-425(1951) MICROWAVE SPECTRUM OF METHYL ALCOHOL

168. F.K.HURD AND W.D.HERSCHBERGER,PHYS.REV.82,95-96(1951) MICROWAVE SPECTRUM OF METHYL MERCAPTAN

169. C.M.JOHNSON,R.TRAMBARULO,AND W.GORDY,PHYS.REV.84,1178-1180(1951) MICROWAVE SPECTROSCOPY IN THE REGION FROM TWO TO THREE MILLIMETERS. PART II.

170. P.KISLIUK AND C.H.TOWNES,PHYS.REV.83,210 (1951) NEW MICROWAVE DATA ON TRICHLORIDES OF ELEMENTS OF THE FIFTH COLUMN

171. D.R.LIDE,JR.,J.CHEM.PHYS.19,1605-1606(1951) THE MICROWAVE SPECTRUM OF METHYL STANNANE

172. C.C.LOOMIS AND M.W.P.STRANDBERG,PHYS.REV.81,798-807(1951) MICROWAVE SPECTRUM OF PHOSPHINE,ARSINE, AND STILBINE

173. R.G.LUCE AND J.W.TRISCHKA,PHYS.REV.83,851-852(1951) MOLECULAR CONSTANTS OF CS(133)CL(35)

174. N.W.LUFT,DIS. FARADAY SOC.10,117-118(1951) GENERAL DISCUSSION

175. H.LYONS,L.J.RUEGER,R.G.NUCKOLLS,AND M.KESSLER,PHYS.REV.81,630-631 (1951) MICROWAVE SPECTRA OF DEUTERO-AMMONIAS

176. K.B.MCAFEE,JR.,PHYS.REV.82,971(1951) MICROWAVE SPECTRUM OF NO2

177. S.L.MILLER,A.JAVAN, AND C.H.TOWNES,PHYS.REV.82,454-455(1951) THE SPIN OF O(18)

178. J.D.ROGERS,W.J.PIETENPOL,AND D.WILLIAMS,PHYS.REV.83,431-434(1951) THE MICROWAVE ABSORPTION SPECTRUM OF NITROSYL CHLORIDE NOCL

179. J.D.ROGERS AND D.WILLIAMS,PHYS.REV.82,131 (1951) MICROWAVE ABSORPTION SPECTRUM OF HYDROGEN AZIDE

180. J.D.ROGERS AND D.WILLIAMS,PHYS.REV.83,210 (1951) MICROWAVE ABSORPTION SPECTRUM OF FORMIC ACID VAPOR

181. T.F.ROGERS,PHYS.REV.83,881 (1951) FAR WING ABSORPTION OF ATMOSPHERIC SPECTRUM LINES

182. T.M.SHAW AND J.J.WINDLE,J.CHEM.PHYS.19,1063-1064(1951) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF METHYL MERCAPTAN

183. J.SHERIDAN AND W.GORDY,J.CHEM.PHYS.19,965-970(1951) THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF TRIFLUOROSILANE DERIVATIVES

184. J.N.SHOOLERY,R.G.SHULMAN,AND D.M.YOST,J.CHEM.PHYS. 19,250-251(1951) DIPOLE MOMENT AND ELECTRIC QUADRUPOLE EFFECTS IN HNCO AND HNCS

185. M.H.SIRVETZ,J.CHEM.PHYS.19,938-941(1951) THE MICROWAVE SPECTRUM OF

SULFUR DIOXIDE

186. M.H.SIRVETZ,J.CHEM.PHYS.19,1609-1610(1951) THE MICROWAVE SPECTRUM OF FURAN

187. D.F.SMITH,M.TIDWELL,D.V.P.WILLIAMS, AND S.J.SENATORE,PHYS.REV.83, 485 (1951) THE MICROWAVE SPECTRUM OF CARBONYL FLUORIDE

188. R.M.TALLEY AND A.H.NIELSEN,J.CHEM.PHYS.19,805-806(1951) VIBRATION ROTATION TRANSITIONS OF C2D2 IN THE MICROWAVE REGION

189. E.AMBLE,S.L.MILLER,A.L.SCHAWLOW, AND C.H.TOWNES,J.CHEM.PHYS.20-192 (1952) MICROWAVE SPECTRUM AND STRUCTURE OF REO3CL

190. R.O.CARLSON,C.A.LEE,AND B.P.FABRICAND,PHYS.REV.85,784-787(1952) THE MOLECULAR BEAM ELECTRIC RESONANCE METHOD STUDY OF THALLIUM MONOCHLORIDE

191. V.W.COHEN,ANN.N.Y.ACAD.SCI.55,904-914(1952) SPECTROSCOPY OF RADIOACTIVE MOLECULES

192. R.M.FRISTROM,J.CHEM.PHYS.20,1-5(1952) THE MICROWAVE SPECTRUM OF A SLIGHTLY ASPHERICAL TOP-THE STRUCTURE AND DIPOLE MOMENT OF SULFURYL FLUORIDE

193. S.N.GHOSH,R.TRAMBARULO,AND W.GORDY,J.CHEM.PHYS.20,605-607(1952) MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF FLUOROFORM,CHLOROFORM, AND METHYL CHLOROFORM

194. N.J.HAWKINS,V.W.COHEN,AND W.S.KOSKI,J.CHEM.PHYS.20,528(1952) THE MICROWAVE SPECTRA OF POF3 AND PSF3

195. H.J.HROSTOWSKI,R.J.MYERS,AND G.C.PIMENTEL,J.CHEM.PHYS.20,518(1952) THE MICROWAVE SPECTRA AND DIPOLE MOMENT OF STABLE PENTABORANE

196. A.JAVAN AND A.V.GROSSE,PHYS.REV.87,227 (1952) MICROWAVE SPECTRUM OF MNO3F

197. H.R.JOHNSON AND M.W.P.STRANDBERG,J.CHEM.PHYS.20,687-695(1952) THE MICROWAVE SPECTRUM OF KETENE

198. P.KISLIUK AND G.A.SILVEY,J.CHEM.PHYS.20,517(1952) THE MICROWAVE SPECTRUM OF CF3SF3

199. S.KOJIMA,K.TSUKADA,S.HAGIWARA,M.MIZUSHIMA,AND T.ITO, J.CHEM.PHYS.20, 804-808(1952) MICROWAVE SPECTRA OF CHBR3 IN THE REGION FROM 11 TO 12.5 CENTIMETERS

200. D.R.LIDE,JR.,J.CHEM.PHYS.20,1812(1952) PRELIMINARY ANALYSIS OF THE PURE-ROTATIONAL SPECTRUM OF METHYL AMINE ERRATA-J.CHEM.PHYS.21, 571(1953)

201. D.R.LIDE,JR.,J.AM.CHEM.SOC.74,3548-3552(1952) THE MICROWAVE SPECTRUM AND STRUCTURE OF METHYLENE FLUORIDE

202. J.T.MASSEY AND D.R.BIANCO,PHYS.REV.85,717-718 (1952) MICROWAVE ABSORPTION SPECTRUM OF H2O2

203. J.M.MAYS,ANN.N.Y.ACAD.SCI.55,789-799(1952) SPECTROSCOPIC

MEASUREMENTS ON HIGH-BOILING,REACTIVE,AND UNSTABLE MOLECULES

204. J.M.MAYS AND B.P.DAILEY,J.CHEM.PHYS.20,1695-1703(1952) MICROWAVE SPECTRA AND STRUCTURES OF XYH3 MOLECULES

205. S.L.MILLER,L.C.AAMODT,G.DOUSMANIS,C.H.TOWNES,AND J.KRAITCHMAN, J.CHEM.PHYS.20,1112-1114(1952) STRUCTURE OF METHYL HALIDES

206. R.MOCKLER,J.H.BAILEY, AND W.GORDY,PHYS.REV.87,172 (1952) MICROWAVE INVESTIGATIONS OF HSICL3 AND CH3SICL3

207. H.W.MORGAN AND J.H.GOLDSTEIN,J.CHEM.PHYS.20,1981(1952) THE MICROWAVE SPECTRUM OF VINYLACETATE

208. A.H.NETHERCOT,J.A.KLEIN, AND C.H.TOWNES, PHYS.REV.86,798-799(1952) THE MICROWAVE SPECTRUM AND MOLECULAR CONSTANTS OF HYDROGEN CYANIDE

209. N.F.RAMSEY,PHYS.REV.87,1075-1079(1952) VIBRATIONAL AND CENTRIFUGAL EFFECTS ON NUCLEAR INTERACTIONS AND ROTATIONAL MOMENTS IN MOLECULES

210. A.L.SCHAWLOW,ANN.N.Y.ACAD.SCI.55,955-965(1952) SIGNIFICANCE OF THE RESULTS OF MICROWAVE SPECTROSCOPY FOR NUCLEAR THEORY

211. J.SHERIDAN AND W.GORDY,J.CHEM.PHYS.20,591-595(1952) THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF TRIFLUOROMETHYL BROMIDE, IODIDE, AND CYANIDE

212. J.SHERIDAN AND W.GORDY,J.CHEM.PHYS.20,735-738(1952) THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF METHYL BROMOACETYLENE AND METHYL IODOACETYLENE

213. G.SILVEY,W.A.HARDY, AND C.H.TOWNES,PHYS.REV.87,236 (1952) MASSES OF THE STABLE TELLURIUM ISOTOPES FROM THE MICROWAVE SPECTRUM OF TECS

214. J.W.SIMMONS AND J.H.GOLDSTEIN,J.CHEM.PHYS.20,122-124(1952) THE MICROWAVE SPECTRA OF THE DEUTERATED METHYL HALIDES

215. D.F.SMITH AND D.W.MAGNUSON,PHYS.REV.87,226-227 (1952) THE MICROWAVE SPECTRUM OF NITRYL FLUORIDE

216. S.J.TETENBAUM,PHYS.REV.86,440-446(1952) MICROWAVE SPECTRUM OF BRCN AT SIX MILLIMETERS

217. S.J.TETENBAUM,PHYS.REV.88,772-774(1952) SIX-MILLIMETER SPECTRA OF OCS AND N2O

218. T.L.WEATHERLY AND D.WILLIAMS,J.CHEM.PHYS.20,755(1952) THE MICROWAVE ABSORPTION SPECTRUM OF ACETONE VAPOR

219. W.S.WILCOX AND J.H.GOLDSTEIN,J.CHEM.PHYS.20,1656-1657(1952) EVIDENCE FOR A COMPLETELY PLANAR STRUCTURE OF PYRROLE FROM ITS MICROWAVE SPECTRUM

220. W.S.WILCOX,J.H.GOLDSTEIN,AND J.W.SIMMONS,PHYS.REV.87,172(1952) THE MICROWAVE SPECTRUM OF VINYL CYANIDE

221. Q.WILLIAMS,J.T.COX, AND W.GORDY,J.CHEM.PHYS.20,1524-1525(1952) MOLECULAR STRUCTURE OF BROMOFORM

222. Q.WILLIAMS,J.SHERIDAN, AND W.GORDY,J.CHEM.PHYS.20,164-167(1952) MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF POF3,PSF3,POCL3, AND PSCL3

223. F.ANDERSON,J.R.ANDERSEN,B.BAK,O.BASTIENSEN,E.RISBERG,AND L.SMEDVIK, J.CHEM.PHYS.21,373(1953) ELECTRON DIFFRACTION AND MICROWAVE INVESTIGATION OF TERTIARY BUTYL FLUORIDE

224. W.F.ARENDALE AND W.H.FLETCHER,J.CHEM.PHYS.21,1898(1953) THE GEOMETRY OF KETENE

225. B.BAK,J.BRUHN,AND J.RASTRUP-ANDERSEN,J.CHEM.PHYS.21,752-753(1953) MICROWAVE SPECTRUM AND STRUCTURE OF SID3F

226. B.BAK,J.BRUHN,AND J.RASTRUP-ANDERSEN,J.CHEM.PHYS.21,753-754(1953) MICROWAVE SPECTRUM AND STRUCTURE OF SID3CL

227. B.BAK AND J.RASTRUP-ANDERSEN,J.CHEM.PHYS.21,1305-1306(1953) MICROWAVE INVESTIGATION OF PYRIDINE

228. Y.BEERS AND S.WEISBAUM,PHYS.REV.91,1014(1953) AN ULTRA-HIGH FREQUENCY ROTATIONAL LINE OF HDO

229. R.BIRD AND R.C.MOCKLER,PHYS.REV.91,222 (1953) THE MICROWAVE SPECTRUM OF THE UNSTABLE MOLECULE CARBON MONOSULFIDE

230. G.BIRNBAUM AND A.A.MARYOTT,PHYS.REV.92,270-273(1953) CHANGE IN THE INVERSION SPECTRUM OF ND3 FROM RESONANT TO NONRESONANT ABSORPTION

231. C.A.BURRUS AND W.GORDY,PHYS.REV.92,1437-1439(1953) ONE-TO-TWO MILLIMETER WAVE SPECTROSCOPY. III. NO AND DI

232. C.A.BURRUS AND W.GORDY,PHYS.REV.92,274-277(1953) ONE-TO-TWO MILLIMETER WAVE SPECTROSCOPY. II. H2S

233. H.D.CRAWFORD,J.CHEM.PHYS.21,2099(1953) TWO NEW LINES IN THE MICROWAVE SPECTRUM OF HEAVY WATER

234. B.P.DAILEY,PHYS.REV.90,337-338 (1953) THE ROTATIONAL SPECTRUM AND MOLECULAR STRUCTURE OF CYCLOPROPYL CHLORIDE

235. G.C.DOUSMANIS,T.M.SANDERS,C.H.TOWNES, AND H.J.ZEIGER,J.CHEM.PHYS.21, 1416-1417(1953) STRUCTURE OF HNCS FROM MICROWAVE SPECTRA

236. G.ERLANDSSON,ARKIV.FYSIK 6,477-478(1953) MICROWAVE SPECTRUM OF FLUOROBENZENE

237. G.ERLANDSSON,ARKIV FYSIK 6,69-71(1953) MEASUREMENTS OF THE MICROWAVE SPECTRA OF METHYL ALCOHOL AND NITROMETHANE

238. G.ERLANDSSON,ARKIV FYSIK 6,491-495(1953) PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF FORMIC ACID

239. R.C.FERGUSON AND E.B.WILSON,JR.,PHYS.REV.90,338(1953) THE MICROWAVE SPECTRUM AND STRUCTURE OF THIONYL FLUORIDE

240. A.HONIG,M.L.STITCH, AND M.MANDEL,PHYS.REV.92,901-902(1953) MICROWAVE SPECTRA OF CSF,CSCL,AND CSBR

241. R.H.HUGHES,J.CHEM.PHYS.21,959-960(1953) THE MICROWAVE SPECTRUM AND STRUCTURE OF OZONE

242. E.V.IVASH AND D.M.DENNISON,J.CHEM.PHYS.21,1804-1816(1953) THE METHYL ALCOHOL MOLECULE AND ITS MICROWAVE SPECTRUM

243. C.K.JEN,D.R.BIANCO,AND J.T.MASSEY,J.CHEM.PHYS.21,520-525(1953) SOME HEAVY WATER ROTATIONAL ABSORPTION LINES

244. R.D.JOHNSON,R.J.MYERS,AND W.D.GWINN,J.CHEM.PHYS.21,1425(1953) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF ETHYLENIMINE

245. W.C.KING AND W.GORDY,PHYS.REV.90,319-320(1953) ONE TO TWO MILLIMETER WAVE SPECTROSCOPY. I.

246. P.KISLIUK AND S.GESCHWIND,J.CHEM.PHYS.21,828-829(1953) THE MICROWAVE SPECTRUM OF ARSENIC TRIFLUORIDE

247. J.A.KLEIN AND A.H.NETHERCOT,PHYS.REV.91,1018(1953) MICROWAVE SPECTRUM OF DI AT 1.5 MM WAVELENGTH

248. J.H.N.LOUBSER,J.CHEM.PHYS.21,2231-2232(1953) PRELIMINARY WORK ON THE MICROWAVE SPECTRUM OF ACETIC ACID

249. K.E.MCCULLOH AND G.F.POLLNOW,J.CHEM.PHYS.21,2082(1953) MICROWAVE SPECTRUM OF PYRIDINE

250. M.MIZUSHIMA,J.CHEM.PHYS.21,1222-1224(1953) THEORY OF THE ROTATIONAL SPECTRA OF ALLENE-TYPE MOLECULES

251. M.MIZUSHIMA AND P.VENKATESWARLU,J.CHEM.PHYS.21,705-709(1953) THE POSSIBLE MICROWAVE ABSORPTION IN THE MOLECULES BELONGING TO THE POINT GROUPS D2D=VD AND TD

252. R.C.MOCKLER,J.H.BAILEY, AND W.GORDY,J.CHEM.PHYS.21,1710-1713(1953) MICROWAVE SPECTRA AND MOLECULAR STRUCTURES OF HSICL3,CH3SICL3,AND (CH3)3SICL

253. R.C.MOCKLER AND W.GORDY,PHYS.REV.91,222 (1953) MICROWAVE SPECTRUM OF TRIMETHYL CHLOROSILICANE

254. N.MULLER,J.AM.CHEM.SOC.75,860-863(1953) THE MICROWAVE SPECTRUM AND STRUCTURE OF CHLOROFLUOROMETHANE

255. A.H.NETHERCOT AND A.JAVAN,J.CHEM.PHYS.21,363-364(1953) THE MICROWAVE SPECTRUM OF C8H13BR AND C8H13CL

256. H.H.NIELSEN,J.CHEM.PHYS.21,142-144(1953) THE INFRARED SPECTRA AND THE MOLECULAR STRUCTURE OF PYRAMIDAL MOLECULES

257. R.G.NUCKOLLS,L.J.RUEGER, AND H.LYONS,PHYS.REV.89,1101(1953) MICROWAVE ABSORPTION SPECTRUM OF ND3

258. D.W.POSENER AND M.W.P.STRANDBERG,J.CHEM.PHYS.21,1401-1402(1953) MICROWAVE SPECTRUM OF HDO

259. G.W.ROBINSON,J.CHEM.PHYS.21,1741-1745(1953) THE MICROWAVE SPECTRUM OF PHOSGENE

260. A.H.SHAUGH,G.A.HEATH,L.P.THOMAS, AND J.SHERIDAN,NATURE 171,87(1953) MICROWAVE SPECTRUM AND STRUCTURE OF IODOSILANE

261. K.SHIMODA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 8,133-134(1953) MICROWAVE SPECTRUM OF METHYLAMINE

262. K.SHIMODA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 8,425-426(1953) MICROWAVE SPECTRUM OF METHYLAMINE

263. M.E.SIRVETZ AND R.E.WESTON,J.CHEM.PHYS.21,898-902(1953) THE STRUCTURE OF PHOSPHINE

264. D.F.SMITH,J.CHEM.PHYS.21,609-614(1953) THE MICROWAVE SPECTRUM AND STRUCTURE OF CHLORINE TRIFLUORIDE

265. N.SOLIMENE AND B.P.DAILEY,PHYS.REV.91,464 (1953) THE ROTATIONAL SPECTRUM AND MOLECULAR STRUCTURE OF METHYL MERCAPTAN

266. T.E.TURNER,V.C.FIORA,W.M.KENDRICK,AND B.L.HICKS,J.CHEM.PHYS.21, 564-565(1953) PRELIMINARY ANALYSIS OF THE MICROWAVE SPECTRUM OF ETHYLENIMINE

267. P.VENKATESWARLU,R.C.MOCKLER,AND W.GORDY,J.CHEM.PHYS.21,1713-1715(1953) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF TRICHLOROGERMANE

268. S.WEISBAUM,Y.BEERS, AND G.HERRMANN,PHYS.REV.90,338 (1953) S-BAND SPECTRUM OF HDO

269. W.S.WILCOX,K.C.BRANNOCK,W.DEMORE, AND J.H.GOLDSTEIN,J.CHEM.PHYS.21, 563-564(1953) THE MICROWAVE SPECTRUM AND GENERAL PROPERTIES OF ETHYLENE IMINE

270. B.BAK,L.HANSEN,AND J.RASTRUP-ANDERSEN,J.CHEM.PHYS.22,565(1954) MICROWAVE SPECTRUM OF PYRIDINE

271. B.BAK,L.HANSEN,AND J.RASTRUP-ANDERSEN,J.CHEM.PHYS.22,2013-2017(1954) MICROWAVE DETERMINATION OF THE STRUCTURE OF PYRIDINE

272. C.A.BURRUS AND W.GORDY,PHYS.REV.93,897-898(1954) SUBMILLIMETER WAVE SPECTROSCOPY

273. C.A.BURRUS,A.JACHE,AND W.GORDY,PHYS.REV.95,706-708(1954) ONE-TO-TWO MILLIMETER WAVE SPECTROSCOPY. V. PH3 AND PD3

274. C.D.CORNWELL AND R.L.POYNTER,J.CHEM.PHYS.22,1257(1954) THE MICROWAVE SPECTRUM OF VINYL IODIDE

275. B.B.DEMORE,W.S.WILCOX,AND J.H.GOLDSTEIN,J.CHEM.PHYS.22,876-880(1954) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF PYRIDINE

276. G.ERLANDSSON,ARKIV FYSIK 7,189-192(1954) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF FLUOROBENZENE

277. G.ERLANDSSON,J.CHEM.PHYS.22,563-564(1954) MICROWAVE SPECTRUM OF CYCLOPENTANONE

278. G.ERLANDSSON,ARKIV FYSIK 8,341-342(1954) MICROWAVE SPECTRUM OF CHLOROBENZENE

279. G.ERLANDSSON,J.CHEM.PHYS.22,1152(1954) MICROWAVE SPECTRUM OF BENZONITRILE

280. R.C.FERGUSON,J.AM.CHEM.SOC.76,850-853(1954) THE MICROWAVE SPECTRUM ,STRUCTURE,AND DIPOLE MOMENT OF THIONYL FLUORIDE

281. W.GORDY,J.PHYS.RADIUM 15,521-523(1954) SPECTROSCOPY FROM 1 TO 5 MM WAVELENGTH

282. W.GORDY AND C.A.BURRUS,PHYS.REV.93,419-420(1954) SPECTRUM OF DBR IN THE ONE-MILLIMETER WAVE REGION

283. W.GORDY AND J.SHERIDAN,J.CHEM.PHYS.22,92-95(1954) MICROWAVE SPECTRA AND STRUCTURES OF METHYL MERCURY CHLORIDE AND BROMIDE

284. G.R.GUNTHER-MOHR,R.L.WHITE,A.L.SCHAWLOW,W.E.GOOD,AND D.K.COLES, PHYS.REV.94,1184-1191(1954) HYPERFINE STRUCTURE IN THE SPECTRUM OF N(14)H3. I. EXPERIMENTAL RESULTS

285. R.C.GUNTON,J.F.OLLOM,AND H.N.REXROAD,J.CHEM.PHYS.22,1942(1954) THE MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF (CH3)3SIF

286. W.A.HARDY AND G.SILVEY,PHYS.REV.95,385-388(1954) MICROWAVE SPECTRUM OF TECS AND MASSES OF THE STABLE TELLURIUM ISOTOPES

287. G.A.HEATH,L.F.THOMAS,AND J.SHERIDAN,TRANS.FARADAY SOC.50,779-783 (1954) THE STRUCTURE OF TRIFLUOROSILANE FROM MICROWAVE SPECTRA

288. A.HONIG,M.MANDEL,M.L.STITCH,AND C.H.TOWNES,PHYS.REV.96,629-642(1954) MICROWAVE SPECTRA OF THE ALKALI HALIDES

289. H.J.HROSTOWSKI AND R.J.MYERS,J.CHEM.PHYS.22,262-265(1954) THE MICROWAVE SPECTRA,STRUCTURE,AND DIPOLE MOMENT OF STABLE PENTABORANE

290. A.JACHE,G.BLEVINS,AND W.GORDY,PHYS.REV.95,299 (1954) MILLIMETER WAVE SPECTRUM OF ARSINE

291. A.JAVAN AND A.ENGELBRECHT,PHYS.REV.96,649-658(1954) MICROWAVE ABSORPTION SPECTRA OF MNO3F AND REO3CL

292. P.KISLIUK,J.CHEM.PHYS.22,86-92(1954) DIPOLE MOMENTS,NUCLEAR QUADRUPOLE COUPLINGS, AND THE BONDING ORBITALS IN GROUP V-TRIHALIDES

293. S.KOJIMA AND K.TSUKADA,J.CHEM.PHYS.22,2093-2094(1954) ON THE INTERPRETATION OF THE SPECTRUM OF BROMOFORM

294. J.A.KRAITCHMAN AND B.P.DAILEY,PHYS.REV.,94,788 (1954) THE MICROWAVE SPECTRUM OF ETHYL FLUORIDE

295. D.R.LIDE,JR.,J.CHEM.PHYS.22,1577-1578(1954) MICROWAVE SPECTRUM AND STRUCTURE OF BENZONITRILE

296. R.J.LOVELL AND E.A.JONES,PHYS.REV.95,300 (1954) POTENTIAL CONSTANTS FOR CARBONYL FLUORIDE

297. J.F.LOTSPEICH,A.JAVAN,AND A.ENGELBRECHT,PHYS.REV.94,789 (1954)

THE MICROWAVE SPECTRUM OF REO3F

298. J.T.MASSEY,C.I.BEARD,AND C.K.JEN,PHYS.REV.95,622 (1954) A MICROWAVE SPECTRAL SERIES OF DEUTERATED HYDROGEN PEROXIDE

299. J.T.MASSEY AND D.R.BIANCO,J.CHEM.PHYS.22,442-448(1954) THE MICROWAVE SPECTRUM OF HYDROGEN PEROXIDE

300. M.MATRICON AND BONNET,J.PHYS.RADIUM 15,647-648(1954) SPECTRUM OF ETHYLAMINE

301. K.E.MCCULLOH AND G.F.POLLNOW,J.CHEM.PHYS.22,681-682(1954) AN INVESTIGATION OF THE MICROWAVE SPECTRUM OF PYRIDINE

302. M.PETER AND M.W.P.STRANDBERG,PHYS.REV.95,622 (1954) MICROWAVE SPECTRUM OF OCS

303. J.SHERIDAN AND L.F.THOMAS,NATURE 174,798(1954) MICROWAVE SPECTRUM OF METHYLCYANOACETYLENE

304. K.SHIMODA,T.NISHIKAWA,AND T.ITOH,J.PHYS.SOC.JAPAN 9,974-991(1954) MICROWAVE SPECTRUM OF METHYLAMINE

305. G.R.SLAYTON,J.W.SIMMONS,AND J.H.GOLDSTEIN,J.CHEM.PHYS.22,1678-1679 (1954) MICROWAVE SPECTRUM AND PROPERTIES OF VINYLENE CARBONATE

306. N.SOLIMENE AND B.P.DAILEY,J.CHEM.PHYS.22,2042-2044(1954) MICROWAVE SPECTRUM OF 1,1 DIFLUOROETHANE

307. F.STERZER,J.CHEM.PHYS.22,2094(1954) J=0→1 ROTATIONAL TRANSITION OF TRIFLUOROIODOMETHANE
ERRATUM- J.CHEM.PHYS.23,762(1955)

308. R.TRAMBARULO AND P.M.MOSER,J.CHEM.PHYS.22,1622-1623(1954) MICROWAVE SPECTRUM OF FORMIC ACID

309. R.S.WAGNER AND B.P.DAILEY,J.CHEM.PHYS.22,1459(1954) MICROWAVE SPECTRUM OF ETHYL CHLORIDE

310. W.S.WILCOX,J.H.GOLDSTEIN, AND J.W.SIMMONS,J.CHEM.PHYS.22,516-518 (1954) THE MICROWAVE SPECTRUM OF VINYL CYANIDE

311. B.BAK,L.HANSEN,AND J.RASTRUP-ANDERSEN,DIS.FARADAY SOC.19,30-38 (1955) MICROWAVE SPECTRA OF DEUTERATED FURANS-STRUCTURE OF THE FURAN MOLECULE

312. A.I.BARCHUKOV,T.M.MINAEVA,AND A.M.PRODHOROV,ZHUR.EKSPTL.I TEORET. FIZ.29,892(1955) MICROWAVE ROTATION SPECTRUM OF THE ETHYL CHLORIDF,C2H5CL,MOLECULE

313. A.H.BARRETT AND M.MANDEL,PHYS.REV.99,666 (1955) MICROWAVE SPECTRA OF INDIUM CHLORIDE AND BROMIDE

314. N.G.BASOV AND A.M.PROKHOROV,ZHUR.EKSPTL.I TEORET.FIZ.28,249-250 (1955) POSSIBLE METHOD FOR OBTAINING ACTIVE MOLECULES FOR A MOLECULAR GENERATOR

315. G.S.BLEVINS,A.W.JACHE,AND W.GORDY,PHYS.REV.97,684-686(1955) MILLIMETER WAVE SPECTRA OF ASH3 AND ASD3

316. J.H.BURKHALTER,J.CHEM.PHYS.23,1172(1955) MICROWAVE SPECTRUM OF CYCLOPENTANONE

317. C.A.BURRUS,JR. AND W.GORDY,PHYS.REV.97,1661-1664(1955) ONE-TO-TWO MILLIMETER WAVE SPECTRA OF TCL AND TBR

318. C.C.COSTAIN,J.CHEM.PHYS.23,2037-2041(1955) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF METHYL-CHLOROACETYLENE

319. J.T.COX,T.GAUMANN, AND W.J.O.THOMAS,DIS.FARADAY SOC.19,52-55(1955) MILLIMETER WAVE SPECTRUM OF METHYL MERCURY CHLORIDE

320. G.ERLANDSSON,ARKIV FYSIK 9,341-343(1955) MICROWAVE SPECTRUM OF CYCLOPENTENE OXIDE

321. J.FINE,J.H.GOLDSTEIN,AND J.W.SIMMONS,J.CHEM.PHYS.23,601(1955) MICROWAVE SPECTRUM OF S-TRANS-ACROLEIN

322. J.P.FRIEND,R.F.SCHNEIDER,AND B.P.DAILEY,J.CHEM.PHYS.23,1557(1955) MICROWAVE SPECTRUM OF CYCLOPROPYL CHLORIDE

323. J.J.GALLAGHER,W.C.KING,AND AND C.M.JOHNSON,PHYS.REV.98,1551(1955) THE MICROWAVE SPECTRUM OF N(15)O(16)

324. E.K.GORA,PHYS.REV.99,666(1955) MICROWAVE SPECTRUM OF THE OZONE MOLECULE

325. G.A.HEATH,L.F.THOMAS,E.I.SHERRARD,AND J.SHERIDAN,DIS.FARADAY SOC.19, 38-43(1955) THE MICROWAVE SPECTRUM AND STRUCTURE OF METHYL DIACETYLENE

326. J.A.HOWE AND J.H.GOLDSTEIN,J.CHEM.PHYS.23,1223-1225(1955) MICROWAVE SPECTRUM OF PROPIOLIC ALDEHYDE

327. T.ITO,J.PHYS.SOC.JAPAN 10,56-59(1955) MICROWAVE SPECTRUM OF SPCL3,THEORETICAL

328. A.W.JACHE,G.S.BLEVINS,AND W.GORDY,PHYS.REV.97,680-683(1955) MILLIMETER WAVE SPECTRA OF SBH3 AND SBD3

329. T.KOJIMA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 10,240-241(1955) MICROWAVE SPECTRUM OF METHYL MERCAPTAN I.

330. J.KRAITCHMAN AND B.P.DAILEY,J.CHEM.PHYS.23,184-190(1955) THE MICROWAVE SPECTRUM OF ETHYL FLUORIDE

331. R.J.KURLAND,J.CHEM.PHYS.23,2202-2203(1955) MICROWAVE SPECTRUM AND PLANARITY OF FORMAMIDE

332. N.KWAK,J.W.SIMMONS,AND J.H.GOLDSTEIN,J.CHEM.PHYS.23,2450(1955) MICROWAVE SPECTRUM OF PROPIOLACTONE

333. R.G.LERNER,J.P.FRIEND,AND B.P.DAILEY,J.CHEM.PHYS.23,210(1955) STRUCTURE AND BARRIER TO INTERNAL ROTATION OF FORMIC ACID FROM MICROWAVE DATA

334. M.MANDEL AND A.H.BARRETT,PHYS.REV.98,1159(1955) PURE ROTATION SPECTRA OF THE THALLIUM HALIDES

335. A.A.MARYOTT AND G.BIRNBAUM,PHYS.REV.99,1886(1955) MICROWAVE ABSORPTION IN COMPRESSED OXYGEN

336. D.J.MILLEN AND K.M.SINNOTT,CHEMISTRY AND INDUSTRY 1955,538(1955) THE MICROWAVE SPECTRUM AND STRUCTURE OF NITRYL CHLORIDE

337. R.C.MOCKLER AND G.R.BIRD,PHYS.REV.98,1837-1839(1955) MICROWAVE SPECTRUM OF CARBON MONOSULFIDE

338. Y.MORINO AND E.HIROTA,J.CHEM.PHYS.23,737-747(1955) MEAN AMPLITUDES OF THERMAL VIBRATIONS IN POLYATOMIC MOLECULES. III. THE GENERALIZED MEAN AMPLITUDES

339. T.NISHIKAWA ,T.ITOH,AND K.SHIMODA,J.CHEM.PHYS.23,1735-1736(1955) MOLECULAR STRUCTURE OF METHYLAMINE FROM ITS MICROWAVE SPECTRUM

340. D.W.POSENER,J.CHEM.PHYS.23,1728-1729(1955) NOTE ON THE X-BAND MICROWAVE SPECTRUM OF HEAVY WATER

341. B.ROSENBLUM AND A.H.NETHERCOT,JR.,PHYS.REV.97,84-85(1955) MICROWAVE SPECTRA OF TRITIUM IODIDE AND TRITIUM BROMIDE

342. N.SOLIMENE AND B.P.DAILEY,J.CHEM.PHYS.23,124-129(1955) STRUCTURE AND BARRIER HEIGHT OF METHYL MERCAPTAN FROM MICROWAVE DATA

343. L.F.THOMAS,E.I.SHERRARD,AND J.SHERIDAN,TRANS.FARADAY SOC.51,619-625 (1955) MICROWAVE SPECTRA OF SOME PARTIALLY DEUTERIATED METHYL DERIVATIVES. I. METHYL CYANIDE AND METHYL ACETYLENE

344. K.TSUKADA,J.PHYS.SOC.JAPAN 10,60-64(1955) MICROWAVE SPECTRA OF SPCL3,EXPERIMENTAL

345. T.E.TURNER,V.C.FIORA,AND W.M.KENDRICK,J.CHEM.PHYS.23,1966(1955) MICROWAVE SPECTRUM OF IMINE-DEUTERIATED ETHYLENIMINE

346. P.VENKATESWARLU,H.D.EDWARDS,AND W.GORDY,J.CHEM.PHYS.23,1195-1199 (1955) METHYL ALCOHOL I.MICROWAVE SPECTRUM

347. P.VENKATESWARLU,H.D.EDWARDS,AND W.GORDY,J.CHEM.PHYS.23,1200-1202 (1955) METHYL ALCOHOL. II. MOLECULAR STRUCTURE

348. R.S.WAGNER,N.SOLIMENE,AND B.P.DAILEY,J.CHEM.PHYS.23,599(1955) MICROWAVE SPECTRUM OF ETHYL BROMIDE

349. S.WEISBAUM,Y.BEERS,AND G.HERRMANN,J.CHEM.PHYS.23,1601-1605(1955) LOW FREQUENCY ROTATIONAL SPECTRUM OF HDO

350. Q.WILLIAMS AND T.L.WEATHERLY,PHYS.REV.98,1159(1955) THE MICROWAVE SPECTRUM OF NITROSYL BROMIDE

351. F.A.ANDERSEN,B.BAK,AND S.BRODERSEN,J.CHEM.PHYS.24,989-992(1956) NORMAL VIBRATION FREQUENCIES OF CD3F. STRUCTURE OF CH3F AND CD3F FROM INFRARED AND MICROWAVE SPECTRA

352. B.BAK,D.CHRISTENSEN,L.HANSEN,AND J.RASTRUP-ANDERSEN,J.CHEM.PHYS.24, 720-725(1956) MICROWAVE DETERMINATION OF THE STRUCTURE OF PYRROLE

353. B.BAK,D.CHRISTENSEN,J.RASTRUP-ANDERSEN,AND E.TANNENBAUM,J.CHEM.

PHYS.25,892-895(1956) MICROWAVE SPECTRA OF THIOPHENE,2- AND 3-MONODEUTERIO,3,3--DIDEUTERO,AND TETRADEUTERIOTHIOPHENE. STRUCTURE OF THE THIOPHENE MOLECULE

354. A.I.BARCHOLOV,T.M.MIKAEVA,AND A.M.PROKHOROV,SOVIET PHYS.JETP 2, 760(1956) MICROWAVE ROTATION SPECTRUM OF THE ETHYL CHLORIDE MOLECULE

355. G.R.BIRD,J.CHEM.PHYS.25,1040-1043(1956) MICROWAVE SPECTRUM OF NO2- A RIGID ROTOR ANALYSIS

356. G.ERLANDSSON,J.CHEM.PHYS.25,379(1956) MILLIMETER WAVE SPECTRUM OF FORMIC ACID

357. G.ERLANDSSON,J.CHEM.PHYS.25,579-580(1956) MILLIMETER WAVE SPECTRUM OF FORMALDEHYDE

358. G.ERLANDSSON AND J.COX,J.CHEM.PHYS.25,778-779(1956) MILLIMETER WAVE LINES OF HEAVY WATER

359. H.G.FITZKY AND H.HAPP,Z.NATURFORSCH 11A,957-958(1956) THE MICROWAVE SPECTRUM OF METHYL ALCOHOL

360. H.HIRAKAWA,A.MIYAHARA,AND K.SHIMODA,J.PHYS.SOC.JAPAN 11,334-335(1956) MICROWAVE SPECTRA OF FORMALDEHYDE AND METHYL AMINE IN THE SUPERHIGH-FREQUENCY REGION

361. H.HIRAKAWA,T.OKA,AND K.SHIMODA,J.PHYS.SOC.JAPAN 11,1207(1956) MICROWAVE SPECTRA OF HCHO-D1,D2

362. R.H.HUGHES,J.CHEM.PHYS.24,131-138(1956) STRUCTURE OF OZONE FROM THE MICROWAVE SPECTRUM BETWEEN 9000 AND 45000 MC/SEC

363. A.W.JACHE,P.W.MOSER,AND W.GORDY,J.CHEM.PHYS.25,209-210(1956) MILLIMETER WAVE SPECTRUM ,MOLECULAR STRUCTURE,AND DIPOLE MOMENT OF HYDROGEN SELENIDE

364. N.KWAK,J.H.GOLDSTEIN,AND J.W.SIMMONS,J.CHEM.PHYS.25,1203-1205(1956) MICROWAVE SPECTRUM OF BETA-PROPIOLACTONE

365. V.W.LAURIE,J.CHEM.PHYS.24,635-636(1956) MICROWAVE SPECTRUM AND AND DIPOLE MOMENT OF CYCLOPENTADIENE

366. A.A.MARYOTT AND G.BIRNBAUM,J.CHEM.PHYS.24,1022-1026(1956) MICROWAVE ABSORPTION IN COMPRESSED GASES-SATURATED HYDROCARBONS

367. D.J.MILLEN AND J.R.MORTON,CHEMISTRY AND INDUSTRY 1956,954(1956) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF NITRIC ACID

368. A.OKAYA,J.PHYS.SOC.JAPAN 11,258-263(1956) MICROWAVE HYPERFINE SPECTRUM OF FORMALDEHYDE

369. J.F.OLLOM,A.A.SINISGALLI,H.N.REXROAD,AND R.C.GUNTON,J.CHEM.PHYS.24, 487-488(1956) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF (CH3)3SIBR

370. H.N.REXROAD,D.W.HOWGATE,R.C.GUNTON,AND J.F.OLLOM,J.CHEM.PHYS.24, 625(1956) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF (CH3)3SII

371. P.SWARUP,Z.PHYSIK 144,632-636(1956) ABSORPTION AND DISPERSION OF MICROWAVES IN METHYL BROMIDE

372. P.SWARUP,PHYS.REV.104,89-90(1956) DISPERSION OF MICROWAVES IN ND3

373. V.G.VESELAGO AND A.M.PROKHOROV,ZHUR.EKSPTL.I.TEORET,FIZ.31,731(1956) THE HDSE MICROWAVE SPECTRUM

374. T.L.WEATHERLY AND Q.WILLIAMS,J.CHEM.PHYS.25.717-721(1956) MICROWAVE SPECTRUM AND MOLECULAR CONSTANTS OF NITROSYL BROMIDE

375. R.WERTHEIMER,COMPT.REND.242,243-244(1956) ABSORPTION SPECTRUM OF FORMIC ACID VAPOR IN THE VICINITY OF 3 MM.

376. R.WERTHEIMER,ARCH.SCI.(GENEVA)9,47-48(1956) ABSORPTION SPECTRUM OF FORMIC ACID VAPOR BETWEEN THE WAVELENGTHS OF 4.5 AND 2.5 MM

377. R.WERTHEIMER,COMPT.REND.242,1591-1593(1956) THE ROTATIONAL SPECTRUM AND INERTIAL CONSTANTS OF THE FORMIC ACID MOLECULE

378. P.N.WOLFE,J.CHEM.PHYS.25,976-981(1956) MICROWAVE SPECTRUM OF CHLOROFORM

379. L.YARMUS,PHYS.REV.104,365-367(1956) HYPERFINE STRUCTURE IN THE L-TYPE DOUBLING SPECTRUM OF HYDROGEN CYANIDE

380. W.ZEIL,Z.ELEKTROCHEM.60,752-755(1956) THE MICROWAVE SPECTRUM OF TRICHLOROACETONITRILE AND OF 1,1,1-TRICHLOROETHANE FROM 23,500 TO 25,500 MC
ERRATA-Z.ELEKTROCHEM.60,1204(1956)

381. W.ZEIL,Z.NATURFORSCH 11A,677-678(1956) THE MICROWAVE SPECTRUM OF 1,1,1 TRICHLOROETHANE

382. B.BAK,D.CHRISTENSEN,L.HANSEN-NYGAARD,AND E.TANNENBAUM,J.CHEM.PHYS. 26,134-137(1957) MICROWAVE DETERMINATION OF THE STRUCTURE OF FLUOROBENZENE

383. B.BAK,D.CHRISTENSEN,L.HANSEN-NYGAARD,AND E.TANNENBAUM,J.CHEM.PHYS. 26,241-243(1957) MICROWAVE DETERMINATION OF THE STRUCTURE OF TRIFLUOROBUTYNE

384. J.G.BAKER,D.R.JENKINS,C.N.KENNEY,AND T.M.SUGDEN,TRANS.FARADAY SOC.53, 1397-1401(1957) MICROWAVE SPECTRUM AND STRUCTURE OF TRICHLOROACETONITRILE

385. H.H.BLAU,JR.AND H.H.NIELSEN,J.MOL.SPECTRY.1,124-132(1957) INFRARED ABSORPTION SPECTRUM OF FORMALDEHYDE VAPOR

386. C.A.BURRUS AND W.GORDY,J.CHEM.PHYS.26,391-394(1957) SPECTRA OF SOME SYMMETRIC TOP MOLECULES IN THE ONE-TO -FOUR MILLIMETER WAVE REGION

387. W.F.EDGELL,P.A.KINSEY,AND J.W.AMY,J.AM.CHEM.SOC.79,2691-2693(1957) THE MICROWAVE SPECTRA AND STRUCTURE OF CF2=CH2,CF2=CHD,AND CF2=CD2

388. W.F.EDGELL,G.B.MILLER,AND J.W.AMY,J.AM.CHEM.SOC.79,2391-2393(1957) THE MICROWAVE SPECTRA AND MOLECULAR STRUCTURE OF 1,1,1-TRIFLUORO-ETHANE AND ITS MONO-,DI-,AND TRIDEUTERO DERIVATIVES

389. P.GOEDERTIER AND K.L.LEE,ANN.SOC.SCI.BRUXELLES 71,128-133(1957) PURE ROTATION SPECTRA OF LIGHT AND HEAVY VINYL BROMIDE BY MICROWAVE METHOD

390. P.GOEDERTIER AND K.L.LEE,ANN.SOC.SCI.BRUXELLES 71,184-188(1957) PURE ROTATION SPECTRA OF VINYL BROMIDE

391. H.HAPP,Z.PHYSIK 147,567-572(1957) MICROWAVE SPECTRUM OF THALLIUM(I) IODIDE AND BISMUTH CHLORIDE IN THE 3 CM AND 1.5 CM BAND

392. T.KOJIMA AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 12,680-686(1957) POTENTIAL BARRIER AND MOLECULAR STRUCTURE OF METHYL MERCAPTAN FROM ITS MICROWAVE SPECTRA

393. KRISHNAJI AND G.P.SRIVASTAVA,PHYS.REV.106,1186-1189(1957) MICROWAVE ABSORPTION IN ETHYL CHLORIDE

394. R.J.KURLAND AND E.B.WILSON,JR.,J.CHEM.PHYS.27,585-590(1957) MICROWAVE SPECTRUM ,STRUCTURE,DIPOLE MOMENT,AND QUADRUPOLE COUPLING CONSTANTS OF FORMAMIDE

395. V.W.LAURIE,J.CHEM.PHYS.26,1359-1362(1957) MICROWAVE SPECTRUM, DIPOLE MOMENT,AND STRUCTURE OF DIFLUOROSILANE

396. R.G.LERNER AND B.P.DAILEY,J.CHEM.PHYS.26,678-680(1957) MICROWAVE SPECTRUM AND STRUCTURE OF PROPIONITRILE

397. R.G.LERNER ,B.P.DAILEY,AND J.P.FRIEND,J.CHEM.PHYS.26,680-683(1957) MICROWAVE SPECTRUM AND STRUCTURE OF FORMIC ACID

398. D.R.LIDE,JR.,D.E.MANN, AND R.M.FRISTROM,J.CHEM.PHYS.26,734-739(1957) MICROWAVE SPECTRUM AND STRUCTURE OF SULFURYL FLUORIDE

399. D.W.MAGNUSON,J.CHEM.PHYS.27,223-226(1957) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF BROMINE TRIFLUORIDE

400. K.MATSUURA,Y.SUGIURA,AND G.M.HATOYAMA,PHYS.REV.106,607(1957) FREQUENCY OF THE AMMONIA (3,3) LINE

401. I.A.MUKHTAROV,SOVIET PHYSICS-DOKLADY-2,357-358(1957) MICROWAVE SPECTRA OF 1,2-FLUOROCHLOROETHANE

402. B.D.OSIPOV,OPTIKA I SPEKTROSKOPIYA 3,94-95(1957) HYPERFINE STRUCTURE OF ROTATIONAL TRANSITION J=3→4 OF THE MEI(127) MOLECULE

403. E.D.PALIK AND E.F.BELL,J.CHEM.PHYS.26,1093-1101(1957) PURE ROTATIONAL SPECTRA OF THE PARTIALLY DEUTERATED AMMONIAS IN THE FAR INFRARED SPECTRAL REGION

404. S.SEKINO AND T.NISHIKAWA,J.PHYS.SOC.JAPAN 12,43-48(1957) MICROWAVE SPECTRUM OF VINYLIDENE CHLORIDE

405. H.SELEN,ARKIV. FYSIK 13,81-83(1957) MICROWAVE SPECTRUM OF CHLOROBENZENE

406. K.SHIMODA,J.PHYS.SOC.JAPAN 12,558(1957) PRECISE FREQUENCY OF THE 3,3 INVERSION LINE OF NH3

407. T.SPARSTAD AND E.AMBLE,J.CHEM.PHYS.27,317(1957) MICROWAVE SPECTRUM AND STRUCTURE OF (CH3)3CCN

408. L.F.THOMAS,J.S.HEEKS,AND J.SHERIDAN,Z.ELEKTROCHEM.61,935-937(1957) MICROWAVE SPECTRA OF SOME MOLECULES CONTAINING -CF3 AND SIF3 GROUPS

409. V.G.VESELAGO AND A.M.PROKHOROV,SOVIET PHYS.JETP 4,751(1957) THE HDSE MICROWAVE SPECTRUM

410. R.S.WAGNER AND B.P.DAILEY,J.CHEM.PHYS.26,1588-1593(1957) MICROWAVE SPECTRUM OF ETHYL CHLORIDE

411. R.S.WAGNER,B.P.DAILEY,AND N.SOLIMENE,J.CHEM.PHYS.26,1593-1596(1957) MICROWAVE SPECTRUM OF ETHYL BROMIDE

412. R.WAGNER,J.FINE,J.W.SIMMONS,AND J.H.GOLDSTEIN,J.CHEM.PHYS.26, 634-637(1957) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF S-TRANS-ACROLEIN

413. R.WERTHEIMER,ARCH.SCI.(GENEVA)10,184-186(1957) MOLECULAR CONSTANTS OF FORMIC ACID FROM THE ROTATIONAL SPECTRUM

414. R.WERTHEIMER AND M.CLOUARD,COMPT.REND.245,1793-1794(1957) ABSORPTION OF SULFUROUS ANHYDRIDE(SO2) IN THE MILLIMETER WAVE REGION

415. B.BAK,D.CHRISTENSEN,L.HANSEN-NYGAARD,AND J.RASTRUP-ANDERSEN, SPECTROCHIM.ACTA 13,120-124(1958) THE STRUCTURE OF VINYL FLUORIDE

416. B.BAK,L.HANSEN-NYGAARD,AND J.RASTRUP-ANDERSEN,J.MOL.SPECTRY.2,54-57 (1958) THE STRUCTURE OF TERTIARY BUTYL ISOCYANIDE

417. B.BAK,L.HANSEN-NYGAARD,AND J.RASTRUP-ANDERSEN,J.MOL.SPECTRY.2, 361-368(1958) COMPLETE DETERMINATION OF THE STRUCTURE OF PYRIDINE BY MICROWAVE SPECTRA

418. A.I.BARCHUKOV AND N.G.BASOV,OPTIKA I SPEKTROSKOPIYA 4,532(1958) FREQUENCIES AND INTENSITIES OF HYPERFINE STRUCTURE LINES OF CH3I (THE TRANSITION I=0-1)

419. A.I.BARCHUKOV,T.M.MURINE,AND A.M.PROKHOROV,OPTIKA I SPEKTROSKOPIYA 4,521-523(1958) MICROWAVE SPECTRUM AND ROTATION CONSTANTS OF ETHYL CHLORIDE MOLECULE

420. A.I.BARCHUKOV AND A.M.PROKHOROV,OPTIKA I SPEKTROSKOPIYA 5,530-534 (1958) QUADRUPOLE BOND,DIPOLE MOMENT,AND THE INTERNAL ROTATION BARRIER IN THE CH3GEH3 MOLECULE,DETERMINED FROM ITS ROTATIONAL SPECTRUM

421. A.I.BARCHUKOV AND A.M.PROKHOROV,OPTIKA I SPEKTROSKOPIYA 4,799(1958) MICROWAVE SPECTRUM OF CH3GEH3

422. A.H.BARRETT AND M.MANDEL,PHYS.REV.109,1572-1589(1958) MICROWAVE SPECTRA OF THALLIUM,INDIUM,AND GALLIUM MONOHALIDES

423. M.COWAN AND W.GORDY,PHYS.REV.111,209-211(1958) PRECISION MEASUREMENTS OF MILLIMETER AND SUBMILLIMETER WAVE SPECTRA-DEUTERIUM CHLORIDE ,DEUTERIUM BROMIDE,AND DEUTERIUM IODIDE

424. A.P.COX,L.F.THOMAS,AND J.SHERIDAN,NATURE 181,1000-1001(1958) MICROWAVE SPECTRA OF DIAZOMETHANE AND ITS DEUTERIO DERIVATIVES

425. A.P.COX,L.F.THOMAS,AND J.SHERIDAN,NATURE 181,1157-1158(1958) MICROWAVE SPECTRUM OF NICKEL CYCLOPENTADIENYL NITROSYL AND THE CONFIGURATION OF THE MOLECULE

426. C.W.N.CUMPER,TRANS.FARADAY SOC.54,1266-1270(1958) STRUCTURE OF SOME HETEROCYCLIC MOLECULES

427. G.ERLANDSSON,J.CHEM.PHYS.28,71-75(1958) MILLIMETER WAVE SPECTRUM OF FORMIC ACID

428. G.ERLANDSSON AND H.SELEN,ARKIV FYSIK 14,61-64(1958) DIPOLE MOMENT OF FORMIC ACID

429. J.P.FRIEND AND B.P.DAILEY,J.CHEM.PHYS.29,577-582(1958) MICROWAVE STUDIES OF THE STRUCTURE OF CYCLOPROPYL DERIVATIVES

430. H.G.FRITZKY,Z.PHYSIK 151,351-364(1958) THE MICROWAVE ROTATION SPECTRUM OF THALLIUM(I) HALIDES

431. E.HIROTA,J.CHEM.PHYS.28,839-846(1958) ROTATIONAL STRUCTURE OF THE INFRARED ABSORPTION SPECTRUM OF HYDROGEN PEROXIDE VAPOR

432. E.HIROTA,T.OKA,AND Y.MORINO,J.CHEM.PHYS.29,444-445(1958) MICROWAVE SPECTRUM,STRUCTURE,DIPOLE MOMENT,AND QUADRUPOLE COUPLING CONSTANT OF PROPARGYL CHLORIDE

433. N.A.IRISOVA,IZVEST.AKAD.NAUK.SSSR.SER.FIZ. 22,1307(1958) DETERMINATION OF ROTATIONAL CONSTANTS OF CH3GECL3 FROM ITS SUPER-HIGH FREQUENCY ABSORPTION SPECTRUM

434. T.KOJIMA,H.HIRAKAWA,AND T.OKA,J.PHYS.SOC.JAPAN 13,321(1958) MICROWAVE SPECTRUM OF HYDRAZINE

435. KRISHNAJI AND G.P.SRIVASTAVA,PHYS.REV.109,1560-1563(1958) MICROWAVE ABSORPTION IN METHYL HALIDES

436. J.MATTAUCH,Z.NATURFORSCH 13A,572-596(1958) MASS UNITS FOR ATOMIC WEIGHTS AND NUCLEDIC MASSES

437. D.J.MILLEN AND K.M.SINNOTT,J.CHEM.SOC.1958,350-355(1958) THE MICROWAVE SPECTRUM ,STRUCTURE,AND DIPOLE MOMENT OF NITRYL CHLORIDE

438. I.A.MUKHTAROV,IZVEST.AKAD.NAUK SSSR SER.FIZ.22,1154-1156(1958) ROTATIONAL CONSTANTS OF THE MOLECULE OF FH2CCH2CL(35)

439. L.PIERCE,J.CHEM.PHYS.29,383-388(1958) MICROWAVE SPECTRUM, INTERNAL BARRIER,STRUCTURE,EQUILIBRIUM CONFORMATION,AND DIPOLE MOMENT OF METHYL MONOFLUOROSILANE

440. J.SHERIDAN,AUTOMATIC MEASUREMENT QUALITY PROCESS PLANTS,PROC.CONF. SWANSEA 1957,185-194(1958) MICROWAVE SPECTROSCOPY IN ANALYSIS AND PROCESS CONTROL

441. G.H.STEWART AND H.EYRING,J.CHEM.ED.35,550-557(1958) THE PRINCIPLE OF MINIMUM BENDING OF ORBITALS

442. J.D.SWALEN AND B.P.STOICHEFF,J.CHEM.PHYS.28,671-674(1958) MICROWAVE SPECTRUM OF METHYL DIFLUOROSILANE

443. R.TRAMBARULO,A.CLARK,AND C.HEARNS,J.CHEM.PHYS.28,736-737(1958) PLANARITY OF THE FORMIC ACID MONOMER

444. V.G.VESELAGO,IZVEST.AKAD.NAUK SSSR SER.FIZ.22,1150-1153(1958) DETERMINATION OF THE STRUCTURE OF THE HDSE MOLECULE FROM THE ROTATIONAL MICROWAVE SPECTRUM

445. J.E.BOGGS AND H.C.AGNEW,J.PHYS.CHEM.63,1127-1129(1959) NONRESONANT MICROWAVE ABSORPTION IN CERTAIN HALOGEN SUBSTITUTED METHANES

446. D.CHRISTENSEN,SPECTROCHIM.ACTA 15,767(1959) PRELIMINARY INVESTIGATION OF THE MICROWAVE ABSORPTION OF ALPHA-FLUORONAPHTHALENE

447. L.CLAYTON,Q.WILLIAMS,AND T.L.WEATHERLY,J.CHEM.PHYS.30,1328-1334(1959) NITRYL CHLORIDE MOLECULAR CONSTANTS FROM MICROWAVE SPECTRUM ANALYSIS ERRATA- J.CHEM.PHYS.31,554(1959)

448. C.C.COSTAIN AND J.R.MORTON,J.CHEM.PHYS.31,389-393(1959) MICROWAVE SPECTRUM AND STRUCTURE OF PROPYNAL(HCCCHO)

449. A.P.COX,L.F.THOMAS,AND J.SHERIDAN,SPECTROCHIM.ACTA 15,542-543(1959) INTERNUCLEAR DISTANCES IN KETENE FROM SPECTROSCOPIC MEASUREMENTS

450. R.F.CURL,JR.,J.CHEM.PHYS.30,1529-1536(1959) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION, AND STRUCTURE OF METHYL FORMATE

451. A.DANTI AND J.L.WOOD,J.CHEM.PHYS.30,582-584(1959) FAR INFRARED SPECTRUM AND THE BARRIER TO INTERNAL ROTATION IN 1,1,1,2-TETRAFLUOROETHANE

452. V.E.DERR AND J.J.GALLAGHER,BULL.AM.PHYS.SOC.4,455(1959) NITRIC OXIDE CONSTANTS FROM MICROWAVE SPECTROSCOPY

453. P.FAVERO,A.M.MIRRI,AND J.G.BAKER,J.CHEM.PHYS.31,566-567(1959) MILLIMETER WAVE SPECTRUM AND STRUCTURE OF FORMYL FLUORIDE

454. A.GIACOMO,NUOVO CIMENTO 14,1082-1092(1959) ON SOME PHENOMENA RELATED TO THE SATURATION OF ROTATIONAL RESONANCES

455. K.E.GORA,J.MOL.SPECTRY 3,78-99(1959) THE ROTATIONAL SPECTRUM OF OZONE

456. D.R.JENKINS AND T.M.SUGDEN,TRANS.FARADAY SOC.55,1473-1479(1959) MICROWAVE SPECTRUM AND STRUCTURE OF 1,1 DIFLUOROVINYL CHLORIDE

457. P.H.KASAI,R.J.MYERS,D.F.EGGERS,JR.,AND K.B.WIBERG,J.CHEM.PHYS.30,512-516(1959) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF CYCLOPROPA

458. T.KASUYA AND T.OKA,J.PHYS.SOC.JAPAN 14,980-981(1959) MICROWAVE SPECTRUM OF ETHYL IODIDE

459. P.G.KOKERITZ AND H.SELEN,ARKIV FYSIK 16,197-198(1959) MICROWAVE SPECTRUM AND ELECTRIC DIPOLE MOMENT OF CYCLOPENTANONE

460. D.G.KOWALEWSKI ,P.KOKERITZ ,AND H.SELEN,J.CHEM.PHYS.31,1438(1959) MICROWAVE SPECTRUM AND ELECTRIC DIPOLE MOMENT OF FLUOROBENZENE

461. L.C.KRISHER AND E.B.WILSON,JR.,J.CHEM.PHYS.31,882-889(1959) MICROWAVE SPECTRUM OF ACETYL CYANIDE

462. V.W.LAURIE,J.CHEM.PHYS.30,1210-1214(1959) MICROWAVE SPECTRUM OF METHYL GERMANE

463. D.R.LIDE,JR.,SPECTROCHIM.ACTA 15,473-476(1959) MICROWAVE SPECTRUM OF TRIMETHYLARSINE

464. D.R.LIDE,JR. AND D.E.MANN,J.CHEM.PHYS.31,1129-1130(1959) MICROWAVE SPECTRUM AND STRUCTURE OF N2F4

465. D.R.LIDE,JR.,R.W.TAFT,JR.,AND P.LOVE,J.CHEM.PHYS.31,561-562(1959) MICROWAVE ABSORPTION IN THE TRIMETHYLAMINE TRIMETHYLBORON ADDITION COMPLEX

466. J.F.LOTSPEICH,A.JAVAN,AND A.ENGELBRECHT,J.CHEM.PHYS.31,633-643(1959) MICROWAVE SPECTRUM AND STRUCTURE OF PERRHENYL FLUORIDE

467. K.MATSUURA,J.PHYS.SOC.JAPAN 14,1826(1959) FREQUENCY SHIFT IN AMMONIA ABSORPTION LINES OTHER THAN (3,3)

468. D.J.MESCHI AND R.J.MYERS,J.MOL.SPECTRY.3,405-416(1959) THE MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF DISULFUR MONOXIDE

469. H.W.MORGAN AND J.H.GOLDSTEIN,J.CHEM.PHYS.30,1025-1028(1959) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF VINYL FLUORIDE

470. I.A.MUKHTAROV,OPTIKA I SPEKTROSKOPIYA 6,260(1959) MICROWAVE SPECTRUM OF THE FH2CCH2CL(37) MOLECULE

471. L.PEKAREK,POKROKY MAT.FYS.ASTRON.4,42-53,162-179(1959) RADIOSPECTROSCOPY-A NEW BRANCH OF MODERN PHYSICS

472. L.PIERCE AND L.C.KRISHER,J.CHEM.PHYS.31,875-882(1959) MICROWAVE SPECTRUM,INTERNAL BARRIER,STRUCTURE,CONFORMATION,AND DIPOLE MOMENT OF ACETYL FLUORIDE

473. L.PIERCE AND J.M.O-REILLY,J.MOL.SPECTRY.3,536-547(1959) MICROWAVE SPECTRUM,DIPOLE MOMENT,AND INTERNAL BARRIER OF 2-FLUOROPROPENE

474. W.E.SMITH,AUSTRALIAN J.PHYS.12,109-112(1959) THE MICROWAVE SPECTRA OF ISOTOPIC MOLECULES OF SULFUR DIOXIDE

475. G.P.SRIVASTAVA,PROC.PHYS.SOC.(LONDON) 74,401-407(1959) MICROWAVE ABSORPTION IN ETHYL CHLORIDE

476. K.K.SVIDZINSKII,OPTICS AND SPECTROSCOPY 6,163-164(1959) ON THE HYPERFINE STRUCTURE OF THE ROTATIONAL SPECTRA OF MOLECULES OF THE SYMMETRIC ROTOR TYPE

477. K.TAKAYANAGI,J.PHYS.SOC.JAPAN 14,1458-1459(1959) ROTATIONAL TRANSITIONS IN HYDROGEN AND DEUTERIUM

478. J.K.TYLER,A.P.COX,AND J.SHERIDAN,NATURE 183,1182-1183(1959) MOLECULAR SYMMETRY IN CYCLOPENTADIENYL THALLIUM AND SOME RELATED COMPOUNDS FROM THEIR MICROWAVE SPECTRA

479. V.G.VESELAGO,OPTICS AND SPECTROSCOPY 6,286-289(1959) DETERMINATION OF THE STRUCTURE AND DIPOLE MOMENT OF HDSE FROM ITS MICROWAVE SPECTRUM

480. R.WERTHEIMER,COMPT.REND.248,1640-1641(1959) ABSORPTION SPECTRUM OF SULFURIC ANHYDRIDE IN THE MILLIMETER WAVE REGION

481. B.BAK,S.DETONI,L.HANSEN-NYGAARD,J.T.NIELSEN,AND J.RASTRUP-ANDERSEN, SPECTROCHIM.ACTA 16,376-383(1960) MICROWAVE DETERMINATION OF THE STRUCTURE OF ETHYL FLUORIDE

482. B.F.BURKE,ASTROPHYS.J.132,514-515(1960) THE RADIO-FREQUENCY SPECTRUM OF H2+

483. J.D.GRAYBEAL,J.CHEM.PHYS.32,1258-1260(1960) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF MONOCHLOROACETONITRILE

484. E.HIROTA AND Y.MORINO,BULL.CHEM.SOC.JAPAN 33,158-162(1960) MICROWAVE SPECTRUM OF MALONONITRILE,CH2(CH)2 I. THE MOLECULAR STRUCTURE IN THE GROUND VIBRATIONAL STATE

485. N.A.IRISOVA AND E.M.DIANOV,OPTIKA I SPEKTROSKOPIYA 9,261(1960) ULTRAHIGH FREQUENCY ABSORPTION OF CH3GEF3

486. T.S.JASEJA,J.MOL.SPECTRY.5,445-457(1960) MICROWAVE SPECTRUM OF IBR AND THE DETERMINATION OF THE MOLECULAR AND NUCLEAR PARAMETERS

487. D.R.JENKINS,R.KEWLEY,AND T.M.SUGDEN,PROC.CHEM.SOC.1960,220(1960) THE MICROWAVE SPECTRUM AND STRUCTURE OF SILYL ISOTHIOCYANATE

488. L.G.JOHNSON,J.CHEM.PHYS.33,949-950(1960) THE MICROWAVE SPECTRUM OF QUINUCLIDINE

489. T.KASUYA,J.PHYS.SOC.JAPAN 15,1273-1277(1960) MICROWAVE SPECTRUM OF ETHYL IODIDE II.

490. T.KASUYA AND T.OKA,J.PHYS.SOC.JAPAN 15,296-303(1960) MICROWAVE SPECTRUM OF ETHYL IODIDE I.

491. R.KEWLEY,K.S.R.MURTY,AND T.M.SUGDEN,TRANS.FARADAY SOC.56,1732-1736 (1960) MICROWAVE SPECTRUM OF SULFUR CHLORIDE PENTAFLUORIDE

492. D.KIVELSON,E.B.WILSON,JR.,AND D.R.LIDE,JR.,J.CHEM.PHYS.32,205-209 (1960) MICROWAVE SPECTRUM,STRUCTURE,DIPOLE MOMENT,AND NUCLEAR QUADRUPOLE EFFECTS IN VINYL CHLORIDE

493. T.KOJIMA,J.PHYS.SOC.JAPAN 15,1284-1291(1960) MICROWAVE SPECTRUM OF METHYL MERCAPTAN

494. L.C.KRISHER,J.CHEM.PHYS.33,304(1960) MICROWAVE SPECTRUM OF ACETYL CYANIDE

495. L.C.KRISHER,J.CHEM.PHYS.33,1237-1241(1960) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION,AND QUADRUPOLE COUPLING OF ACETYL BROMIDE

496. G.H.KWEI AND R.F.CURL,J.CHEM.PHYS.32,1592(1960) MICROWAVE SPECTRUM OF O(18) FORMIC ACID AND THE STRUCTURE OF FORMIC ACID

497. V.W.LAURIE ,J.CHEM.PHYS.32,1588-1589(1960) MICROWAVE SPECTRUM OF TRANS-CROTONONITRILE

498. O.H.LEBLANC,JR.,V.W.LAURIE,AND W.D.GWINN,J.CHEM.PHYS.33,598-600 (1960) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF FORMYL FLUORIDE

499. D.R.LIDE,JR.,J.CHEM.PHYS.33,1514-1518(1960) MICROWAVE SPECTRUM, STRUCTURE,AND DIPOLE MOMENT OF PROPANE

500. C.C.LIN,PHYS.REV.119,1027-1028(1960) HYPERFINE STRUCTURE OF THE MICROWAVE SPECTRA OF THE NO MOLECULE AND THE NUCLEAR QUADRUPOLE MOMENT OF NITROGEN

501. M.W.LONG,O.WILLIAMS,AND T.L.WEATHERLY,J.CHEM.PHYS.33,508-516(1960) MICROWAVE SPECTRUM OF CFCL3

502. A.A.MARYOTT AND G.BIRNBAUM,J.CHEM.PHYS.32,686-691(1960) MICROWAVE ABSORPTION IN COMPRESSED OXYGEN

503. J.T.MASSEY,C.I.BEARD,AND C.K.JEN,J.MOL.SPECTRY.5,405-415(1960) MICROWAVE SPECTRAL SERIES OF DEUTERIATED HYDROGEN PEROXIDE

504. D.J.MILLEN AND J.R.MORTON,J.CHEM.SOC.1960,1523-1528(1960) THE MICROWAVE SPECTRUM OF NITRIC ACID

505. A.M.MIRRI,NUOVO CIMENTO 18,849-855(1960) MILLIMETER WAVE SPECTRUM OF DEUTERIO DERIVATIVES OF FORMIC ACID

506. M.MIZUSHIMA,ASTROPHYS.J. 132,493-501(1960) THEORY OF THE RADIO-FREQUENCY SPECTRA OF THE H2+ MOLECULE-ION

507. M.MIZUSHIMA,J.CHEM.PHYS.32,691-697(1960) THEORY OF MICROWAVE ABSORPTION BY COMPRESSED OXYGEN GAS

508. H.MOON,J.H.GOLDSTEIN,AND J.W.SIMMONS,SPECTROCHIM.ACTA 16,1267 (1960) THE MICROWAVE SPECTRUM OF CHLOROALLENE

509. N.MULLER AND R.C.BRACKEN,J.CHEM.PHYS.32,1577-1578(1960) MICROWAVE SPECTRUM AND STRUCTURE OF H3SICN AND D3SICN

510. T.OKA,J.PHYS.SOC.JAPAN 15,2274-2279(1960) MICROWAVE SPECTRUM OF FORMALDEHYDE II. MOLECULAR STRUCTURE IN THE GROUND STATE

511. T.OKA,H.HIRAKAWA,AND K.SHIMODA,J.PHYS.SOC.JAPAN 15,2265-2273(1960) MICROWAVE SPECTRUM OF FORMALDEHYDE I.K-TYPE DOUBLING SPECTRA

512. L.PIERCE AND D.H.PETERSEN,J.CHEM.PHYS.33,907-913(1960) MICROWAVE SPECTRUM,STRUCTURE,DIPOLE MOMENT,AND INTERNAL ROTATION OF TRIMETHYLSILANE

513. A.M.PROKHOROV AND G.P.SHIPULO,OPTICS AND SPECTROSCOPY 8,218-219(1960) MICROWAVE INVESTIGATION OF THE MOLECULES F3BNH3 AND F3BN(CH3)3

514. K.E.REINERT,Z.NATURFORSCH 15A,85-86(1960) MICROWAVE SPECTRUM AND PLANAR CHARACTER OF THE NITROBENZENE MOLECULE

515. K.V.L.N.SASTRY,PROC.INDIAN ACAD.SCI.51A,301-309(1960) MICROWAVE SPECTRUM OF METHYL AMINE I. EXPERIMENTAL DETAILS AND SPECTRUM OF

CD3NH2

516. J.SHERIDAN,J.K.TYLER,E.E.AYNSLEY,R.E.DODD,AND R.LITTLE,NATURE 185, 96(1960) MICROWAVE SPECTRUM OF FLUORINE CYANIDE

517. T.SHIMIZU AND H.TAKUMA,J.PHYS.SOC.JAPAN 15,646-650(1960) MICROWAVE SPECTRUM OF CIS 1,2 DICHLOROETHYLENE

518. J.K.TYLER AND J.SHERIDAN,PROC.CHEM.SOC.1960,119-120(1960) MICROWAVE SPECTRUM AND STRUCTURE OF FLUOROACETYLENE

519. W.ZEIL,M.WINNEWISSER,H.K.BODENSEH,AND H.BUCHERT,Z.NATURFORSCH 15A,1011-1013(1960) MICROWAVE SPECTRA OF SUBSTITUTED ACETYLENES

520. B.BAK,U.S.DEPT.COM.,OFFICE TECH.SERV.,AD 262,113,26 PP.(1961) DETERMINATION OF THE STRUCTURE OF α - AND β -FLUORONAPHTHALENES AND OTHER SELECTED MOLECULES BY INFRARED AND MICROWAVE TECHNIQUES

521. B.BAK,D.CHRISTENSEN,L.HANSEN-NYGAARD,AND J.RASTRUP-ANDERSEN, J.MOL.SPECTRY.7,58-63(1961) THE STRUCTURE OF THIOPHENE

522. P.CAHILL AND S.BUTCHER,J.CHEM.PHYS.35,2255-2256(1961) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION OF METHYL STANNANE

523. C.C.COSTAIN AND G.P.SRIVASTAVA,J.CHEM.PHYS.35,1903-1904(1961) STUDY OF HYDROGEN BONDING. THE MICROWAVE ROTATIONAL SPECTRUM OF CF3COOH-HCOOH

524. R.F.CURL,JR.,J.L.KINSEY,J.G.BAKER,J.C.BAIRD,G.R.BIRD,R.F.HEIDELBERG, T.M.SUGDEN,D.R.JENKINS,AND C.N.KENNEY,PHYS.REV.121,1119-1123(1961) MICROWAVE SPECTRUM OF CHLORINE DIOXIDE. I. ROTATIONAL ASSIGNMENT

525. W.B.DIXON AND E.B.WILSON,JR.,J.CHEM.PHYS.35,191-198(1961) MICROWAVE SPECTRUM OF METHYL NITRATE

526. R.E.GOEDERTIER,ANN.SOC.ACI.BRUXELLES 75,174-182(1961) ROTATIONAL SPECTRUM OF C(13) ENRICHED VINYL BROMIDE

527. J.E.GRIFFITHS AND K.B.MCAFEE,PROC.CHEM.SOC.1961,456(1961) MICROWAVE SPECTRUM OF GERMANYL FLUORIDE

528. S.DE HEPCEE,ANN.SOC.SCI.BRUXELLES 75,194-211(1961) ROTATIONAL SPECTRA OF VINYL BROMIDES IN THE GROUND STATE AND A VIBRATIONALLY EXCITED STATE IN THE MICROWAVE REGION

529. A.R.HILTON,JR.,A.W.JACHE,J.B.BEAL,JR.,W.D.HENDERSON,AND R.J.ROBINSON, J.CHEM.PHYS.34,1137-1141(1961) MILLIMETER WAVE SPECTRUM AND MOLECULAR STRUCTURE OF OXYGEN DIFLUORIDE

530. E.HIROTA,J.MOL.SPECTRY.7,242-260(1961) MICROWAVE SPECTRUM IN THE EXCITED VIBRATIONAL STATES OF MALONONITRILE,CH2(CN)2. A POSSIBLE ASSIGNMENT OF CCN BENDING MODES

531. E.HIROTA AND Y.MORINO,BULL.CHEM.SOC.JAPAN 34,341-348(1961) MICROWAVE SPECTRA OF PROPARGYL HALIDES. I.MOLECULAR STRUCTURE,DIPOLE MOMENT,AND QUADRUPOLE COUPLING CONSTANT OF PROPARGYL CHLORIDE

532. J.HOEFT,Z.PHYSIK 163,262-276(1961) THE MICROWAVE ROTATION SPECTRUM OF INDIUM MONOCHLORIDE

533. L.M.IMANOV AND CH.O.KADZHAR,DOKLADY AKAD.NAUK.AZERBAIDZHAN SSR. 17,861-863(1961) THE Q BRANCH IN THE MICROWAVE SPECTRA OF C2H5OH

534. B.E.JOB AND J.SHERIDAN,NATURE 192,160-161(1961) MICROWAVE SPECTRUM OF FLUOROACETONITRILE

535. L.C.KRISHER AND E.B.WILSON,JR.,U.S.DEPT.COMMERCE,OFFICE TECH.SERV. PB REPT.145746(1961) MICROWAVE SPECTRUM OF ACETYL CYANIDE

536. V.W.LAURIE,J.CHEM.PHYS.34,291-294(1961) MICROWAVE SPECTRUM OF CIS-DIFLUOROETHYLENE STRUCTURES AND DIPOLE MOMENTS OF FLUOROETHYLENES

537. V.W.LAURIE,J.CHEM.PHYS.34,1516-1519(1961) MICROWAVE SPECTRUM OF ISOBUTYLENE. DIPOLE MOMENT,INTERNAL BARRIER,EQUILIBRIUM CONFORMATION,AND STRUCTURE

538. D.J.MILLEN AND J.PANNELL,J.CHEM.SOC.1961,1322-1328(1961) THE MICROWAVE SPECTRUM,STRUCTURE,AND NUCLEAR QUADRUPOLE COUPLING COEFFICIENTS OF NITROSYL CHLORIDE

539. R.F.MILLER AND R.F.CURL,JR.,J.CHEM.PHYS.34,1847-1848(1961) MICROWAVE SPECTRUM OF O(18) FORMYL F AND THE STRUCTURE OF FORMYL F

540. A.M.MIRRI,A.GUARNIFRI,AND P.FAVERO,NUOVO CIMENTO 19,1189-1194(1961) MILLIMETER WAVE SPECTRUM AND DIPOLE MOMENT OF VINYL FLUORIDE

541. J.M.O-REILLY AND L.PIERCE,J.CHEM.PHYS.34,1176-1181(1961) MICROWAVE SPECTRUM ,STRUCTURE,DIPOLE MOMENT,AND INTERNAL BARRIER OF VINYL SILANE

542. L.PIERCE,R.JACKSON,AND N.DICIANNI,J.CHEM.PHYS.35,2240-2241(1961) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF F2O

543. A.S.RAJAN,PROC.INDIAN ACAD.SCI.53A,89-94(1961) MICROWAVE SPECTRUM OF TRICHLOROACTEONITRILE

544. J.D.ROGERS AND D.WILLIAMS,J.CHEM.PHYS.34,2195-2196(1961) NITROSYL CHLORIDE STRUCTURE

545. K.M.SINNOTT,J.CHEM.PHYS.34,851-861(1961) MICROWAVE SPECTRUM OF ACETYL CHLORIDE

546. K.WADA,Y.KIKUCHI,C.MATSUMURA,E.HIROTA,AND Y.MORINO,BULL.CHEM.SOC. JAPAN 34,337-341(1961) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF CH2CLCN

547. J.F.WESTERKAMP,BOL.ACAD.NACL.CIENC.42,191-200(1961) ASYMMETRIC TOP MOLECULES IN THE MICROWAVE REGION II. CARBONYL CYANIDE AND PERFLUORODIMETHYL ETHER

548. W.ZEIL,M.WINNEWISSER,AND W.HUETTNER,Z.NATURFORSCH 16A,1248-1249(1961) THE MICROWAVE SPECTRUM OF (CH3)3CBR IN THE 20,000 MC RANGE

549. W.ZEIL,M.WINNEWISSER,AND K.MUELLER,Z.NATURFORSCH 16A,1250(1961) MICROWAVE SPECTROSCOPIC INVESTIGATIONS OF (CH3)3CCL AND (CD3)3CCL

550. R.W.ZIMMERER AND M.MIZUSHIMA,PHYS.REV.121,152-155(1961) PRECISE MEASUREMENT OF THE MICROWAVE ABSORPTION FREQUENCIES OF THE

OXYGEN MOLECULE AND THE VELOCITY OF LIGHT

551. B.BAK,D.CHRISTENSEN,J.CHRISTIANSEN,L.HANSEN-NYGAARD,AND J.RASTRUP-ANDERSEN,SPECTROCHIM.ACTA 18,1421-1424(1962) MICROWAVE SPECTRUM AND INTERNAL BARRIER OF ROTATION OF METHYL KETENE

552. B.BAK,D.CHRISTENSEN,L.HANSEN-NYGAARD,AND J.RASTRUP-ANDERSEN,J.MOL. SPECTRY.9,222-224(1962) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF THIAZOLE

553. B.BAK,D.CHRISTENSEN,L.HANSEN-NYGAARD,L.LIPSCHITZ,AND J.RASTRUP-ANDERSEN,J.MOL.SPECTRY.9,225-227(1962) MICROWAVE SPECTRA OF 1,3,4-THIADIAZOLE AND (S(34)) 1,3,4-THIADIAZOLE. DIPOLE MOMENT OF 1,3,4-THIADIAZOLE

554. R.A.BEAUDET,J.CHEM.PHYS.37,2398-2402(1962) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION,AND QUADRUPOLE COUPLING CONSTANTS OF TRANS-1-CHLOROPROPYLENE

555. R.A.BEAUDET AND E.B.WILSON,JR.,J.CHEM.PHYS.37,1133-1138(1962) MICROWAVE SPECTRUM AND BARRIER TO INTERNAL ROTATION OF CIS-1-FLUOROPROPYLENE

556. E.L.BEESON,T.L.WEATHERLY,AND Q.WILLIAMS,J.CHEM.PHYS.37,2926-2929 (1962) MOLECULAR CONSTANTS OF CHLORODIFLUOROMETHANE FROM MICROWAVE SPECTRUM ANALYSIS

557. J.C.CHAUFFOUREAUX,BULL.CLASSE SCI.,AKAD.ROY.BELG.48,1297-1307(1962) MICROWAVE ROTATIONAL SPECTRA OF VINYLIDENE FLUORIDE

558. C.C.COSTAIN,J.MOL.SPECTRY.9,317-336(1962) ANOMALIES IN THE PURE ROTATION SPECTRUM OF FLUOROFORM IN EXCITED VIBRATIONAL STATES

559. R.F.CURL,JR.,J.CHEM.PHYS.37,779-784(1962) MICROWAVE SPECTRUM OF CHLORINE DIOXIDE III. INTERPRETATION OF THE HYPERFINE COUPLING CONSTANTS OBTAINED IN TERMS OF THE ELECTRONIC STRUCTURE ERRATUM- J.CHEM.PHYS.38,1446(1963)

560. J.D.GRAYBEAL AND D.W.ROE,J.CHEM.PHYS.37,2503(1962) MICROWAVE SPECTRUM AND DIPOLE MOMENT OF MONOFLUOROACETONITRILE

561. M.L.GRENIER-BESSON AND S.MAES,PUBL.GROUP.AVAN.METHODES SPECTROG. 1962,29(1962) INTERPRETATION OF MICROWAVE SPECTRA OF PURE ROTATION

562. M.DE HEMPTINNE,F.GREINDL,AND R.RIET,BULL .CLASSE SCI.ACAD.ROY. BELGE.48,397-410(1962) ROTATION SPECTRUM OF SO2

563. R.H.JACKSON,J.CHEM.SOC.1962,4585-4592(1962) THE MICROWAVE SPECTRUM STRUCTURE,AND DIPOLE MOMENT OF DIOXYGEN DIFLUORIDE

564. D.R.JENKINS,R.KEWLEY,AND T.M.SUGDEN,TRANS.FARADAY SOC.58,1284-1290 (1962) MICROWAVE SPECTRUM AND STRUCTURE OF SILYL ISOTHIOCYANATE

565. B.E.JOB AND J.SHERIDAN,NATURE 193,677(1962) PROPARGYL FLUORIDE AND ITS MICROWAVE SPECTRUM

566. W.H.KIRCHHOFF AND E.B.WILSON,JR.,J.AM.CHEM.SOC.84,334-336(1962) THE MICROWAVE SPECTRUM AND STRUCTURE OF NSF3

567. V.W.LAURIE,D.T.PENCE,AND R.H.JACKSON,J.CHEM.PHYS.37,2995-2999(1962) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF CARBONYL FLUORIDE

568. D.R.LIDE,JR.,J.CHEM.PHYS.37,2074-2079(1962) MICROWAVE STUDIES OF BUTADIENE DERIVATIVES I.SPECTRUM OF FLUOROPRENE

569. J.H.N.LOUBSER,J.CHEM.PHYS.36,2808-2809(1962) MICROWAVE SPECTRUM AND STRUCTURE OF TRICHLOROFLUOROMETHANE

570. C.MATSUMURA,E.HIROTA,T.OKA,AND Y.MORINO,J.MOL.SPECTRY.9,366-380(1962) MICROWAVE SPECTRUM OF ACETONITRILE-D3 CD3CN

571. D.B.MCLAY AND C.R.MANN,CAN.J.PHYS.40,61-73(1962) MICROWAVE SPECTRUM AND MOLECULAR STRUCTURE OF CHF2CL

572. J.MICHIELSEN-EFFINGER,BULL.CLASSE SCI.,ACAD.ROY.BELG.48,438-452(1962) ROTATION SPECTRUM OF ETHYL ALCOHOL BY MICROWAVES

573. A.M.MIRRI,P.FAVERO,A.GUARNIERI,AND G.SEMERANO,BOLL.SCI.FAC.CHIM. IND.BOLOGNA 20,110-114(1962) MILLIMETER SPECTRUM OF ASYMMETRIC TRIATOMIC NITROSYL CHLORIDE MOLECULES

574. A.MOZUMDER,PROC.NATL.INST.SCI.INDIA 28,57-73(1962) THE MICROWAVE SPECTRUM OF METHYL ALCOHOL I, GENERAL THEORY

575. A.MOZUMDER,PROC.NATL.INST.SCI.INDIA 28,74-88(1962) THE MICROWAVE SPECTRUM OF METHYL ALCOHOL II. NUMERICAL PART

576. I.A.MUKHTAROV,IZV.AKAD.NAUK.AZERB.SSSR SER.FIZ.MAT.I TEKHN NAUK 1962,59-63(1962) MICROWAVE SPECTRUM OF 1,1,2-TRIFLUOROETHANE

577. L.J.NUGENT AND C.D.CORNWELL,J.CHEM.PHYS.37,523-534(1962) MICROWAVE SPECTRUM OF METHYLDIFLUOROARSINE

578. L.J.NUGENT,D.E.MANN,AND D.R.LIDE,JR.,J.CHEM.PHYS.36,965-971(1962) MICROWAVE STRUCTURE DETERMINATIONS ON TERTIARY BUTYL ACETYLENES AND TERTIARY BUTYL CYANIDE

579. T.OKA AND Y.MORINO,J.MOL.SPECTRY 8,300-314(1962) ANALYSIS OF THE MICROWAVE SPECTRUM OF HYDROGEN SELENIDE

580. L.PIERCE AND SR.V.DOBYNS,J.AM.CHEM.SOC.84,2651-2652(1962) MOLECULAR STRUCTURE,DIPOLE MOMENT,AND QUADRUPOLE COUPLING CONSTANTS OF DIAZIRINE

581. M.G.K.PILLAI,J.PHYS.CHEM.66,179-180(1962) MICROWAVE SPECTRUM OF FORMALDOXIME

582. A.RACHMAN,ARKIV FYSIK 23,291-299(1962) ANALYSIS OF THE MICROWAVE SPECTRUM OF M-FLUOROCHLOROBENZENE

583. W.G.ROTHSCHILD AND B.P.DAILEY,J.CHEM.PHYS.36,2931-2940(1962) MICROWAVE SPECTRUM OF BROMOCYCLOBUTANE

584. R.H.SCHWENDEMAN AND G.D.JACOBS,J.CHEM.PHYS.36,1245-1250(1962) MOLECULAR STRUCTURE OF ETHYL CHLORIDE

585. R.H.SCHWENDEMAN AND G.D.JACOBS,J.CHEM.PHYS.36,1251-1257(1962)

MICROWAVE SPECTRUM,STRUCTURE,QUADRUPOLE COUPLING CONSTANTS, AND BARRIER TO INTERNAL ROTATION OF CHLOROMETHYLSILANE

586. G.SEMERANO,U.S.DEPT.COM.OFFICE TECH.SERV.PB REPT.149,450(1962) THE ELECTRONIC AND MICROWAVE SPECTRUM OF FORMYL FLUORIDE

587. K.SHIMODA,MASER SPECTROSCOPY,PROCEEDINGS OF THE INTERNATIONAL SCHOOL OF PHYSICS ENRICO FERMI. XVII COURSE. TOPICS ON RADIOFREQUENCY SPECTROSCOPY

588. G.P.SHIPULO,OPTIKA I SPEKTROSKOPIYA 13,593-594(1962) MICROWAVE SPECTRUM OF THE HDNCN AND D2NCN MOLECULES

589. G.A.SOBOLEV,A.M.SHCHERBAKOV,AND P.A.AKISHIN,OPTIKA I SPEKTROSKOPIYA 12,147(1962) ROTATIONAL SPECTRUM AND THE DIPOLE MOMENT OF THE VINYL ACETYLENE MOLECULE

590. W.M.TOLLES AND W.D.GWINN,J.CHEM.PHYS.36,1119-1121(1962) STRUCTURE AND DIPOLE MOMENT OF SF4

591. J.K.TYLER,L.F.THOMAS,AND J.SHERIDAN,J.OPT.SOC.AM.52,581(1962) ROTATIONAL SPECTRUM OF THE CYANAMIDE MOLECULE

592. R.VAN RIET,BULL.CLASSE SCI.,ACAD.ROY.BELG.48,659-667(1962) ROTATIONAL SPECTRUM OF THE S(33)O2 MOLECULE AT THE FIRST EXCITED STATE

593. R.VAN RIET,BULL.CLASSE SCI.,ACAD.ROY.BELG.48,1291-1296(1962) ROTATIONAL SPECTRUM OF S(32)O2 AND S(33)O2 MOLECULES IN THE GROUND STATE AND IN THE EXCITED STATE OF THE V2 VIBRATION(INTERVAL 27,500-30,500 MC.)

594. V.F.VOLKOV,N.N.VYSHINSKII,AND N.K.RUDNEVSKII,IZV.AKAD.NAUK SSSR, SER.FIZ.26,1282-1285(1962) VIBRATIONAL AND ROTATIONAL SPECTRA OF TRIMETHYLCHLOROSILANE,TRIETHYLCHLOROSILANE,AND TRIETHYLCHLOROSTANNANE

595. W.ZEIL,W.HUETTNER,AND W.PLEIN,Z.NATURFORSCH 17A,823-824(1962) MICROWAVE SPECTRUM AND QUADRUPOLE COUPLING CONSTANT OF (CH3)3CCL(35)

596. A.BAUDER,F.TANK,AND HS.H.GUENTHARD,HELV.CHIM.ACTA 46,1453-1463(1963) MICROWAVE SPECTRUM,DIPOLE MOMENT,AND STRUCTURE OF CYCLOBUTANONE

597. S.S.BUTCHER,J.CHEM.PHYS.38,2309-2311(1963) MICROWAVE SPECTRUM OF PROPYLENE SULFIDE

598. J.C.CHAUFFOUREAUX,ANN.SOC.SCI.BRUXELLES 77,171-176(1963) GROUND STATE OF VINYLIDENE FLUORIDE. DATA ON THE FIRST EXCITED STATE

599. A.P.COX AND A.S.ESBITT,J.CHEM.PHYS.38,1636-1643(1963) FUNDAMENTAL VIBRATIONAL FREQUENCIES IN KETENE AND THE DEUTEROKETENES

600. R.F.CURL,JR.,V.M.RAO,K.V.L.N.SASTRY,AND J.A.HODGESON,J.CHEM.PHYS. 39,3335-3340(1963) MICROWAVE SPECTRUM OF METHYL ISOCYANATE

601. E.A.V.EBSWORTH, D.R.JENKINS,M.J.MAYS, AND T.M.SUGDEN, J.CHEM.SOC. 1963,21(1963) THE PREPARATION AND STRUCTURE OF SILYL AZIDE

602. L.ESTEROWITZ,J.CHEM.PHYS.39,247-248(1963) ROTATIONAL TRANSITIONS AND CENTRIFUGAL DISTORTION IN THE UHF SPECTRUM OF FORMALDEHYDE

603. C.FLANAGAN AND L.PIERCE,J.CHEM.PHYS.38,2963-2969(1963) MICROWAVE SPECTRUM ,STRUCTURE,AND QUADRUPOLE COUPLING TENSOR OF ETHYL BROMIDE

604. R.E.GOEDERTIER,J.PHYS.(PARIS)24,633-637(1963) ROTATION SPECTRA, QUADRUPOLE COUPLING,AND STRUCTURE OF VINYL BROMIDE

605. L.M.IMANOV AND A.A.ABDURAKHMANOV,IZV.AKAD.NAUK AZERB.SSR SER. FIZ.-MAT. I TEKHN.NAUK 1963,79-82(1963) MICROWAVE SPECTRUM OF CD3CH2OH

606. L.M.IMANOV AND CH.O.KADZHAR,OPTIKA I SPEKTROSKOPIYA 14,300-301(1963) THE SUPERHIGH-FREQUENCY SPECTRUM AND DIPOLE MOMENT OF THE ETHANOL MOLECULE

607. R.KEWLEY,K.V.L.N.SASTRY,AND M.WINNEWISSER,J.MOL.SPECTRY.10,418-441 (1963) THE MILLIMETER WAVE SPECTRA OF ISOCYANIC AND ISOTHIOCYANIC ACIDS

608. R.KEWLEY,K.V.L.N.SASTRY,M.WINNEWISSER,AND W.GORDY,J.CHEM.PHYS.39, 2856-2860(1963) MILLIMETER WAVE SPECTROSCOPY OF UNSTABLE MOLECULAR SPECIES I.CARBON MONOSULFIDE

609. W.H.KIRCHHOFF AND E.B.WILSON JR.,J.AM.CHEM.SOC.85,1726-1729(1963) THE MICROWAVE SPECTRUM AND STRUCTURE OF NSF

610. R.L.KUCZKOWSKI,J.AM.CHEM.SOC.85,3047-3048(1963) SULFUR MONOFLUORIDE-MICROWAVE SPECTRUM OF A SECOND ISOMER

611. R.L.KUCZKOWSKI AND E.B.WILSON,JR.,J.CHEM.PHYS.39,1030-1034(1963) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF CIS-N2F2

612. R.L.KUCZKOWSKI AND E.B.WILSON,JR.,J.AM.CHEM.SOC.85,2028-2029(1963) MICROWAVE AND MASS SPECTRA OF SULFUR MONOFLUORIDE

613. V.W.LAURIE AND D.T.PENCE,J.CHEM.PHYS.38,2693-2697(1963) MICROWAVE SPECTRA AND STRUCTURES OF DIFLUOROETHYLENES

614. I.N.LEVINE,J.CHEM.PHYS.38,2326-2328(1963) STRUCTURE OF FORMALDOXIME

615. D.R.LIDE,JR.,J.CHEM.PHYS.38,456-460(1963) MICROWAVE SPECTRUM AND STRUCTURE OF DIFLUOROAMINE

616. D.R.LIDE,JR.,J.CHEM.PHYS.38,2027(1963) MICROWAVE SPECTRUM OF ALUMINUM MONOFLUORIDE

617. J.S.MUENTER AND V.W.LAURIE,J.CHEM.PHYS.39,1181-1182(1963) MICROWAVE SPECTRUM,STRUCTURE,AND DIPOLE MOMENT OF SILYL ACETYLENE

618. I.A.MUKHTAROV,DOKL.AKAD.NAUK SSSR 148,566-568(1963) MICROWAVE SPECTRUM OF THE F2HCCDHF MOLECULE

619. I.A.MUKHTAROV,OPTIKA I SPEKTROSKOPIYA 15,563-564(1963) MICROWAVE SPECTRUM OF CF2=CHF

620. I.A.MUKHTAROV,DOKL.AKAD.NAUK SSSR 151,1076-1078(1963) MICROWAVE SPECTRUM OF THE F2HC-CH2F MOLECULE

621. I.A.MUKHTAROV,FIZ.PROBL.SPEKTROSKOPII,AKAD.NAUK SSSR,MATERIALY

13-GO(TRINADTSATOGO)SOVESHCH.,LENINGRAD,1960 2,85-87(1963)
THE MICROWAVE SPECTRUM OF TRIFLUOROETHANE

622. R.NELSON,J.CHEM.PHYS.39,2382-2383(1963) MICROWAVE SPECTRUM, MOLECULAR STRUCTURE,AND DIPOLE MOMENT OF DIMETHYLPHOSPHINE

623. E.W.NEUVAR AND A.W.JACHE,J.CHEM.PHYS.39,596-599(1963) MICROWAVE SPECTRUM AND STRUCTURE OF PENTAFLUOROSULFUR BROMIDE

624. R.L.POYNTER,J.CHEM.PHYS.39,1962-1966(1963) MICROWAVE SPECTRUM, QUADRUPOLE COUPLING CONSTANTS,AND DIPOLE MOMENT OF CHLOROBENZENE

625. T.N.SARACHMAN,J.CHEM.PHYS.39,469-473(1963) MICROWAVE SPECTRUM OF NORMAL PROPYL CHLORIDE

626. L.H.SCHARPEN AND V.W.LAURIE,J.CHEM.PHYS.39,1732-1733(1963) STRUCTURE OF ISOBUTYLENE

627. T.SHIGENARI,S.KOBAYASHI,AND H.TAKUMA,J.PHYS.SOC.JAPAN 18,312-313 (1963) (6.3)ROTATIONAL SPECTRUM OF FORMALDEHYDE BY A RADIO-FREQUENCY BEAM-TYPE MASER

628. K.K.SVIDZINSKII,FIZ.PROBL.SPEKTROSKOPII,AKAD.NAUK SSSR,MATERIALY 13-GO(TRINADTSATOGO)SOVESHCH.,LENINGRAD,1960 2,83-85(1963) CALCULATION OF THE HYPERFINE STRUCTURE OF THE INVERSION SPECTRA OF THE ND3 MOLECULE

629. K.TAKAGI AND T.OKA,J.PHYS.SOC.JAPAN 18,1174-1180(1963) MILLIMETER WAVE SPECTRUM OF FORMALDEHYDE

630. K.TAKAGI AND S.SAITO,J.PHYS.SOC.JAPAN 18,1840(1963) MILLIMETER WAVE SPECTRUM OF SO2

631. J.K.TYLER,J.MOL.SPECTRY.11,39-46(1963) MICROWAVE SPECTRUM OF NITRAMIDE

632. J.K.TYLER AND J.SHERIDAN,TRANS.FARADAY SOC.59,2661-2670(1963) STRUCTURAL STUDIES OF LINEAR MOLECULES BY MICROWAVE SPECTROSCOPY

633. R.VAN RIET,ANN.SOC.SCI.BRUXELLES 77,18-29(1963) ROTATIONAL SPECTRUM OF THE S(34)O2 MOLECULE IN THE FIRST VIBRATIONAL EXCITED STATE (12,800-30,000 MC.) AND COMPLIMENTARY STUDY OF THE S(32)O2 AND S(33)O2 MOLECULES IN THE RANGE 25,000-27,500 MC.

634. L.WHARTON AND W.KLEMPERER,J.CHEM.PHYS.38,2705-2708(1963) MICROWAVE SPECTRUM OF BAO

635. L.WHARTON,W.KLEMPERER,L.P.GOLD,R.STRAUCH,J.J.GALLAGHER,AND V.E.DERR, J.CHEM.PHYS.38,1203-1210(1963) MICROWAVE SPECTRUM,SPECTROSCOPIC CONSTANTS,AND ELECTRIC DIPOLE MOMENT OF LI(6)F(19)

636. A.YARIV AND J.P.GORDON,PROC.IEEE 51,4-29(1963) THE LASER

637. A.BAUER AND J.BELLET,J.PHYS.(PARIS)25,805-808(1964) ROTATION SPECTRA OF SO2 IN THE MILLIMETER REGION

638. A.BAUER AND J.BELLET,COMPT.REND.258,873-876(1964) ROTATION SPECTRUM OF SO2 IN MILLIMETER WAVELENGTHS(6 MM. AND 2.2 MM.)

639. R.A.BEAUDET,J.CHEM.PHYS.40,2705-2715(1964) MICROWAVE SPECTRUM, BARRIER TO INTERNAL ROTATION,AND QUADRUPOLE COUPLING CONSTANTS OF CIS-1-CHLOROPROPYLENE

640. S.S.BUTCHER AND E.B.WILSON,JR.,J.CHEM.PHYS.40,1671-1677(1964) MICROWAVE SPECTRUM OF PROPIONALDEHYDE

641. C.C.COSTAIN AND G.P.SRIVASTAVA,J.CHEM.PHYS.41,1620-1627(1964) MICROWAVE ROTATION SPECTRA OF HYDROGEN-BONDED MOLECULES

642. P.A.CURNUCK AND J.SHERIDAN,NATURE 202,591-592(1964) MICROWAVE SPECTRUM OF FLUOROBROMOETHANE

643. L.ESTEROWITZ AND J.ROSENTHAL,J.CHEM.PHYS.40,1986-1987(1964) DIPOLE MOMENT OF N(15)O(16)2

644. A.J.HEBERT,F.W.BREIVOGEL,JR.,AND K.STREET,JR.,J.CHEM.PHYS.41, 2368-2376(1964) RADIO-FREQUENCY AND MICROWAVE SPECTRA OF LIBR BY THE MOLECULAR-BEAM ELECTRIC-RESONANCE METHOD

645. C.D.HOLLOWELL,A.J.HEBERT,AND K.STREET,JR.,J.CHEM.PHYS.41,3540-3545 (1964) RADIO-FREQUENCY AND MICROWAVE SPECTRA OF NAF BY THE MOLECULAR BEAM ELECTRIC-RESONANCE METHOD

646. L.M.IMANOV,A.A.ABDURAKHMANOV,AND R.A.RAGIMOVA,OPTIKA I SPEKTROSKOPIYA 17,306-307(1964) MICROWAVE SPECTRUM AND EFFECTIVE ROTATIONAL CONSTANTS OF THE CD3CH2OH MOLECULE

647. G.JONES AND W.GORDY,PHYS.REV.135,295-296(1964) EXTENSION OF SUBMILLIMETER WAVE SPECTROSCOPY BELOW A HALF MILLIMETER WAVELENGTH

648. G.JONES AND W.GORDY,PHYS.REV.136,1229-1232(1964) SUBMILLIMETER-WAVE SPECTRA OF HCL AND HBR

649. R.KEWLEY,K.V.L.N.SASTRY,AND M.WINNEWISSER,J.MOL.SPECTRY.12,387-401 (1964) MICROWAVE AND MILLIMETER WAVE SPECTRA OF HYDRAZOIC ACID

650. W.J.LAFFERTY AND D.R.LIDE,JR.,J.MOL.SPECTRY 14,407-408(1964) ROTATIONAL CONSTANTS OF EXCITED VIBRATIONAL STATES OF N(14)2O(16)

651. D.R.LIDE,JR.,PROC.MEETING INTERAGENCY CHEM.ROCKET PROPULSION GROUP THERMOCHEM.,1ST,NEW YORK,1963 1,1-2(1964) RECENT MICROWAVE SPECTRAL STUDIES OF HIGH-TEMPERATURE SPECIES

652. D.R.LIDE,JR.,P.CAHILL,AND L.P.GOLD,J.CHEM.PHYS.40,156-159(1964) MICROWAVE SPECTRUM OF LITHIUM CHLORIDE

653. D.R.LIDE,JR. AND M.JEN,J.CHEM.PHYS.40,252-253(1964) MICROWAVE STUDIES OF BUTADIENE DERIVATIVES II. ISOPRENE

654. J.MARTINS AND E.B.WILSON,JR.,J.CHEM.PHYS.41,570-571(1964) MICROWAVE SPECTRUM OF XENON OXYTETRAFLUORIDE

655. D.B.MCLAY,CAN.J.PHYS.42,720-730(1964) MICROWAVE SPECTRUM OF DICHLOROFLUOROETHANE

656. Y.MORINO,Y.KIKUCHI,S.SAITO,AND E.HIROTA,J.MOL.SPECTRY.13,95-118 (1964) EQUILIBRIUM STRUCTURE AND POTENTIAL FUNCTION OF SULFUR DIOXIDE FROM THE MICROWAVE SPECTRUM IN THE EXCITED

VIBRATIONAL STATE

657. I.A.MUKHTAROV,OPTIKA I SPEKTROSKOPIYA 16,360(1964) MICROWAVE SPECTRUM OF THE MOLECULE F2DCCD2F

658. T.OKA,K.TAKAGI,AND Y.MORINO,J.MOL.SPECTRY.14,27-52(1964) MICROWAVE SPECTRUM OF FORMALDEHYDE IN VIBRATIONALLY EXCITED STATES

659. T.OKA,K.TSUCHIYA,S.IWATA,AND Y.MORINO,BULL.CHEM.SOC.JAPAN 37,4-7 (1964) MICROWAVE SPECTRUM OF S-TRIOXANE

660. H.E.RADFORD,J.CHEM.PHYS.40,2732-2733(1964) SYNTHESIS OF DIATOMIC MOLECULES

661. V.M.RAO AND R.F.CURL,JR.,J.CHEM.PHYS.40,3688-3690(1964) MICROWAVE SPECTRUM OF VINYL FORMATE

662. J.S.RIGDEN AND S.S.BUTCHER,J.CHEM.PHYS.40,2109-2114(1964) MICROWAVE SPECTRUM OF METHYL HYPOCHLORITE

663. K.V.L.N.SASTRY AND R.F.CURL,JR.,J.CHEM.PHYS.41,77-80(1964) MICROWAVE SPECTRUM OF N-METHYL METHYLENIMINE

664. R.H.SCHWENDEMAN,G.D.JACOBS,AND T.M.KRIGAS,J.CHEM.PHYS.40,1022-1028 (1964) MOLECULAR STRUCTURE OF CYCLOPROPYLCHLORIDE

665. G.P.SRIVASTAVA,PHYSICA 30,1913-1916(1964) MICROWAVE SPECTRUM OF MONOFLUORO ACETIC ACID

666. F.L.TOBIASON AND R.H.SCHWENDEMAN,J.CHEM.PHYS.40,1014-1021(1964) MICROWAVE SPECTRUM,MOLECULAR STRUCTURE,AND QUADRUPOLE COUPLING CONSTANTS OF 2-CHLOROPROPANE

667. J.K.TYLER,J.CHEM.PHYS.40,1170-1171(1964) MICROWAVE SPECTRUM OF METHINOPHOSPHIDE,HCP

668. M.WINNEWISSER,K.V.L.N.SASTRY,R.L.COOK ,AND W.GORDY,J.CHEM.PHYS.41, 1687-1691(1964) MILLIMETER WAVE SPECTROSCOPY OF UNSTABLE MOLECULAR SPECIES. II. SULFUR MONOXIDE

669. D.R.LIDE,JR.,D.E.MANN AND J.J.COMEFORD,SPECTROCHIM.ACTA 21,497-501 (1965) THE VIBRATIONAL ASSIGNMENT OF SULFURYL FLUORIDE

670. V.M.RAO,J.T.YARDLEY,AND R.F.CURL,JR.,J.CHEM.PHYS.42,284-288(1965) MICROWAVE SPECTRUM OF METHYL THIONYLAMINE